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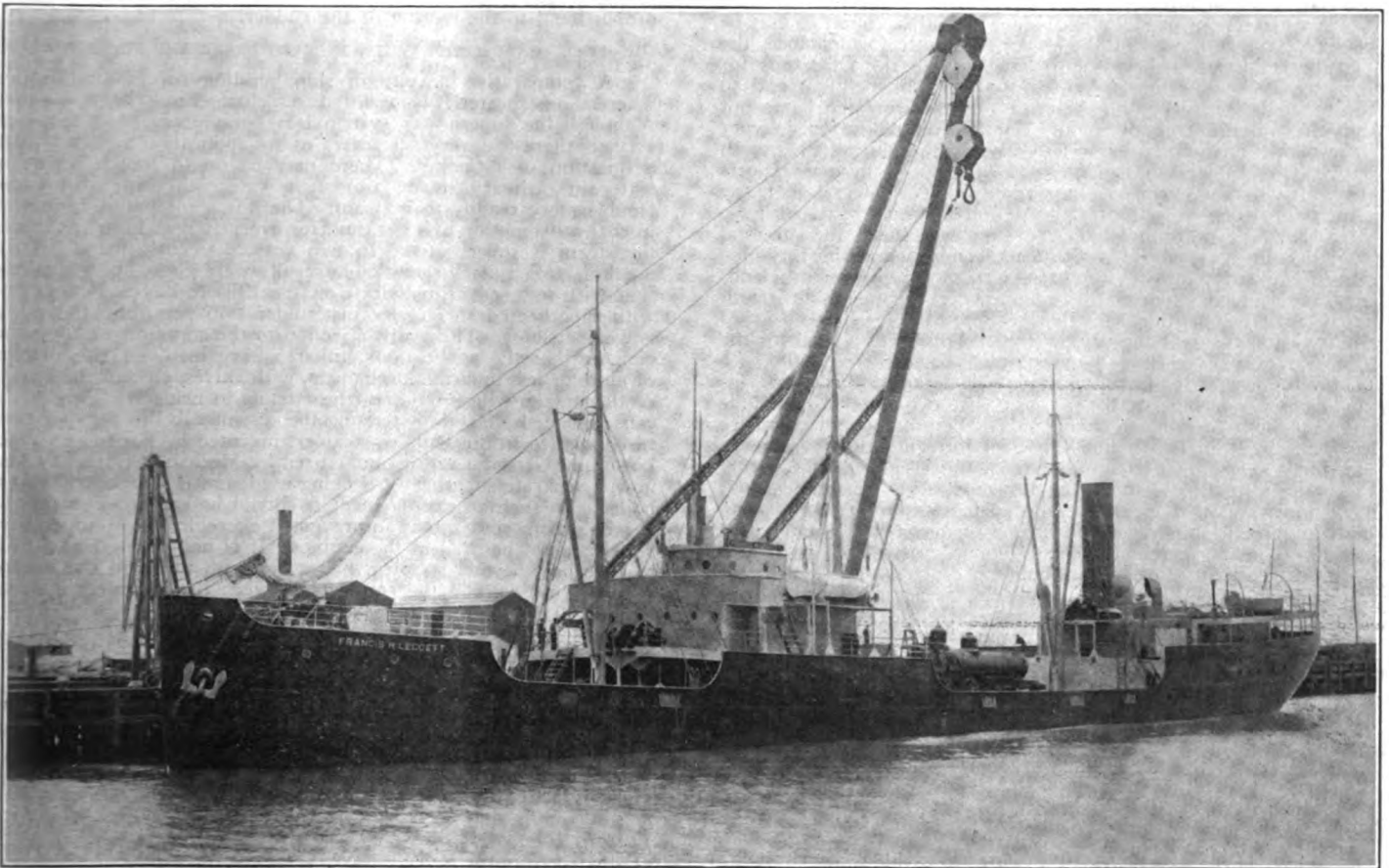
## STEAMER LEGGETT FOR PACIFIC COAST.

Mr. J. J. Lynn, of Port Huron, who is interested in the steamer *Leggett*, built at Newport News for Pacific coast lumber trade, has favored the Review with the picture of the vessel that appears on this page. The *Leggett* is expected to carry 1,500,000 ft. of lumber and has in addition modern accommodations for 40 passengers. She is certainly a trim looking vessel. Dimensions of the vessel are 257 ft. over all, 41 ft. beam, 19 ft. hold, 5 ft. tank. Engines are triple expansion with cylinders of 18, 28½ and 40 in. diameter and common stroke of 40 in. There are two Scotch boilers, 13 by 12 ft., allowed 160 lbs. steam pressure, and three Morison furnaces. The heating surface is 3,700 sq. ft.

The steamer will use oil for fuel and is specially equipped for burning oil. The storage tanks for oil are 5 ft. deep, extending her full length, and will give her about sixty-five days' supply. All

section. The trip was intended to be educational, and those members who have talked of their experience are confident they will be enabled to act with greater intelligence in dealing with appropriations for the several naval stations. Mr. Rixey is confident the trip will result in recommendations that if adopted by congress will increase the efficiency of the navy yards and save a large sum of money to the Treasury. He explained that the committee not only inspected the yards, but had formal conferences with the commandants and other officers, whose opinions and statements were reported stenographically for future reference by the naval committee.

"The organization and business methods of the yards," said Mr. Rixey, "were thoroughly overhauled, with the result that the members of the committee are practically unanimous in the opinion that the present arrangement and management are vicious in the extreme. The navy yards are all organized upon the bureau



Steamer Francis H. Leggett, for Pacific Coast Lumber Trade.

[Built by the Newport News Ship Building & Dry Dock Co., Newport News, Va.]

compartments are manifolded in the engine room to fresh and salt water, steam and air, the latter being exhausted into the different tanks by an electric-driven motor of General Electric pattern. She will be able to go north light, drawing 9½ ft. forward and 13½ ft. aft. Dean Bros. pumps, with which she is fitted, are capable of taking the water out in 1 hour and 15 minutes.

The *Leggett* is commanded by Capt. Edward Johnsen of San Francisco and Harvey E. Thompson is chief engineer.

## NAVY YARDS NEED REORGANIZING.

That the navy yards of the country are in need of thorough reorganization is the opinion of members of the house committee on naval affairs who have visited and inspected all the yards between Norfolk, Va., and Portsmouth, N. H. Representative Rixey of Virginia, who participated in the trip which was made on the *Dolphin*, says the members of the committee are of the opinion that the present system is antiquated, inefficient and extravagant. Reorganization and adoption of modern methods such as are found in private establishments would result in the saving of millions of dollars. Mr. Rixey hopes to see a vigorous, non-partisan effort made in the next congress to promote the efficiency of the yards by a thorough reorganization. The proximity of the yards at Boston and Portsmouth, the distance being only 50 miles, was referred to, and the opinion of several of the committeemen is that there is no necessity for two yards in that

system, which results in the duplication of many buildings and the unnecessary multiplication of expenses. For instance, in every navy yard there are three or more machine shops, three or more power plants, three or more blacksmith shops, three or more foundry plants, and so on, in other lines."

## RECEIVERSHIP EXTENDED.

Judge Putnam, in the United States circuit court at Portland, Me., has appointed James Smith as receiver for the plants of the United States Ship Building Co. in that state. This includes the plants of the Bath Iron Works and the Hyde Windlass Co. of Bath, Me. Considering the fact, however, that the Bath Iron Works is largely engaged on government work contracted for prior to the merging of the ship building plants, he expressly stipulated that this work was to be in no way interfered with. He decreed that the property of the Bath Iron Works shall not come into the complete possession of the receiver until after the completion of the government contracts now existing. But the management of the company must heed the advice and suggestions of the receiver and aim to act in conjunction with him for the best interests of all concerned. Three masters in chancery are to be appointed to make an inventory of the assets and property of the two corporations in question. One the court will appoint, a second to be selected by the complainants and the third by the opponents.

## BRITISH PRODUCTION OF SHIPS.

Interesting Ship Building Statistics from Glasgow—not an Encouraging Outlook—Electric Control of Steering Gear—Other Shipping and Ship Building Matters.

Glasgow, July 20.—The summer holiday season in the Glasgow and west of Scotland industrial circles has begun. It centers round an immemorial institution known as "Glasgow Fair," which was once a famous trade gathering but is now a name only. The period, indeed, is given up to pleasure, not trade—at all events by working men and trades people. The duration of the holiday is nominally a week but it is lengthened or shortened according to the industrial conditions of the year. This year it will probably be lengthened in most instances. The ship yards, for instance, closed down a few days ago, and some of them may not re-start until the end of the month. There are one or two yards at Greenock which are exceptionally pressed with contract work on hand, and which are to be idle for only a few days, but they are quite the exception. In some of the pits the coal miners are taking about ten days off. The iron and steel manufacturers and gas works, etc., usually lay in a special stock of coal to carry them over any possible suspension of the miners' holiday, and for a concern which consumes 1,000 tons a day this is a serious business. But as a rule the iron and steel works keep closed as long as the coal pits, using the interval for the overhaul of plant, the completion of repairs, taking of stock, etc. Some of them are so short of orders that they may elect to let their men play until the end of the month.

A word on our production of ships for other countries may be of interest just now. In the month of June, for instance, the Scotch production included 3,950 tons for Austria, 1,980 tons for Norway, 1,500 tons for Holland, 1,200 tons for Belgium and 50 tons (tug boat) for South America. These were the boats put into the water during the month but not yet ready for delivery to owners. The actual deliveries of new ships during the month by British builders to foreigners, as expressed by the exports from British ports, consisted of twenty-nine steamers of 32,537 tons, two sailing vessels of 54 tons, and fifty-two boats of 1,259 tons. All these were merchant craft, not war ships, and the total is eighty-three vessels of 33,850 tons, comparing with sixty-nine vessels and 24,777 tons in June, 1902. During the six months ending June we have exported to foreign owners 105 merchant steamers of 127,118 tons, thirteen sailers of 6,749 tons, 340 boats of 4,640 tons and two warships of 495 tons. This gives a total for the half year of 460 vessels and 139,002 tons. The corresponding total for the first half of 1902 was 390 vessels and 158,120 tons, including six warships of 8,939 tons. These figures also include the ships built for British colonies. At the present moment there are being built in British ship yards for foreign and colonial owners thirty vessels of 63,650 tons. It should be added that during the past six months we imported 127 small craft (yachts, etc.) of 1,468 tons, and that eleven vessels of 4,010 tons are now being built in foreign ship yards for British owners. The comparative falling off in the merchant tonnage under construction is greater on the Clyde than at other ship building centers. The figures for the Tyne and the Wear on June 30 show as against those for the same period of last year decreases respectively of 11,705 tons and of 30,992 tons. On the Clyde the diminution is about 75,467 tons. From some other ports positive increases are reported—Belfast 8,896 tons, Hartlepool 7,608, Barrow 3,125, and Middlesboro 561 tons. The total tonnage under construction for the whole of the United Kingdom, excluding warships, is 1,028,099 tons, which is less by 101,483 tons than the amount in hand a year ago, and less by 385,000 than the highest figures on record—those of September 1901. The following are, in alphabetical order, the totals at the principal ship building districts of the country, along with those for the same period of last year:

## MERCHANT TONNAGE BUILDING.

At	June 30, 1903.	June 30, 1902.
Belfast .....	195,648	186,752
Barrow, etc. ....	28,840	25,715
Glasgow .....	200,907	244,334
Greenock .....	111,260	143,300
Hartlepool .....	71,771	64,163
Middlesboro .....	69,914	69,353
Newcastle .....	180,783	192,488
Sunderland .....	124,066	155,058

So far as ship building for the mercantile marine is concerned, the situation on the Clyde, the Tyne and the Wear is not satisfactory. On the other hand 100,000 tons of warships in addition are being built at the yards in the Clyde. On the northeast coast Admiralty orders are few and are chiefly confined to the Tyne. At all our ship building centers there are only in hand just now some 7,000 tons of sailing vessels—one-third of the total building twelve months ago.

## ELECTRICAL ARRANGEMENT FOR CONTROLLING STEERING GEAR.

An electrical arrangement introduced by Siemens Bros. & Co. for controlling the steam valve of ship's steering gear from the bridge or other navigating position, the steering engine being in the stern of the vessel under the water line, is attracting much attention. With such electric control arrangement the extensive system of rods and bevel wheels used in some cases, or the system of hydraulic pressure pipes utilized in other ships, will be done away with. This electrical application can be fixed to any type of steam steering gear. The first principle of the Siemens

system is the running of two motors together simultaneously, which is attained by special winding in the armatures. One of the motors is placed under the bridge and occupies small space; the other is at the steering engine. The first of these motors is controlled by the movement of the ordinary steering wheel on the bridge or navigating station, and it is connected through wires with the other motor at the steering engine. The energising of one motor thus causes the other to work coincidentally. Absolute precision is insured by this and by the form of switch adopted, so that the minimum of movement—one revolution of the steering engine—can be easily attained. The movement of the hand steering wheel works the switch, but instead of contact being stationary it is mounted on a worm-wheel engaging in a worm forming an extension of the motor spindle. When the switch energises the motor, the rotation of the motor, acting through the worm, causes the worm-wheel and the contact to leave the switch so that it automatically cuts off current unless the hand wheel and switch are also turned. The switch has thus to hunt the contact. The slightest movement of the hand wheel insures one revolution, or its continuous turning keeping switch and contact together brings the rudder hard over. The worm of itself acts as a break, and when hard over an automatic cut-out at the steering engine comes into operation to prevent the motor being over-run and jammed. Even when cut out in this way the motor is free to be worked in the opposite direction. If by any disconnection of the wires, or failure of steam, or other cause the rudder cannot move, the fact is at once made evident to the man at the wheel. The motion of the hand wheel is always strictly proportional to the motion of the rudder.

## LOW FUEL CONSUMPTION WITH INDUCED DRAFT AND SUPERHEATERS.

A comparative novelty in ship building occurs at Dundee, where a superheater is being fitted to a channel passenger steamer. Although the superheater system is favorably regarded for land service, there are very few cases of its application at sea. It is a question of economy. There may be up to 10 per cent. of water in ordinary steam, and such water will leak and cause trouble more readily than steam. There is a computed reduction in coal consumption of 1 per cent. for every 12 deg. Fahr. to which the steam is superheated. In two vessels recently fitted on the northeast coast some remarkable results were got. The consumption with induced heated draft on the Ellis & Eaves system and with superheated steam was just under 1 lb per indicated horse power per hour. The great objection to the adoption of the principle is that the applications hitherto have involved the placing of more or less intricate mechanism, with valves, etc., in the region of the uptake where the great heat tends to neglect. This is the cause of much delay in extending the system. In the arrangement to be applied to the Dundee steamer, invented by Professor Watkinson, of Glasgow and manufactured by Mechan & Sons of Glasgow, a separate superheater is being used, and is as accessible as a boiler. In such an arrangement it should be easy to control the degree of superheat, so as to prevent it exceeding the temperature which should be used in the engines. It is not deemed advisable to superheat beyond 200 deg. Fahr., but with this and the use of superheating coils in the receivers between the cylinders a great degree of economy could be realized.

## NEW ENGINEER-IN-CHIEF OF THE NAVY.

Charles Whiteside Rae, who is within the present month to succeed Rear Admiral George Wallace Melville as engineer-in-

chief of the navy, was born June 30, 1847, in Hartford, Conn. He is a son of the late Rev. Luzern Rae. He was graduated from the Rensselaer Polytechnic Institute, Troy, N. Y., in the class of 1866 and from the United States naval academy, Annapolis, Md., in the class of 1868, the first class of engineers graduated from the naval academy. He served in various ships and all stations except the Asiatic during periods of sea service. Among other stations on shore he served two terms of four years each at the United States naval academy, the last one as head of



Capt. Charles W. Rae.

the department of steam engineering. During the Spanish-American war he was chief engineer of the battleship Iowa from beginning to end. He engaged in the bombardment of San Juan, Porto Rico, and numerous bombardments at Santiago, and finally in the fight in which Cervera's fleet was destroyed. He was advanced three numbers in grade "for eminent and conspicuous conduct in battle" and received the medal for the campaign in the West Indies. His latest duty has been that of member of the naval examining board at Washington. He was also technical examiner for the United States civil service commission.



## SHIP BUILDING IN NEW ENGLAND.

A recent review of the ship building industry in New England shows that the building of wooden vessels has by no means died out. The yards of Maine and Massachusetts still turn out many fine wooden craft. Yacht building, also, has grown to wonderful proportions. It is estimated that there are some 5,000 pleasure launches and small yachts in New England waters. Elsewhere in this issue brief mention is made of the work under way at the Bath Iron Works, which, despite the troubles of its parent organization, is itself in a prosperous condition. With the exception of 1899 no year has produced more tonnage in Bath than the one ended July 1. In the old days a banner year was 20,000 but in 1899 40,000 tons were built. Last year 29,000 tons were built. One of the busiest plants in Bath is that of the Kelley-Spear Co. This concern launched between Jan. 1 and July 1 two schooners and a barge, and is now building a tug of about 100 tons for the Staples Coal Co. of Taunton, Mass., and a three-masted schooner of 600 tons for Charles S. Hirsch of New York. Timber is on the way for a 2000-ton barge for the Baltimore & Boston Barge Co., while the molds are about ready from which timber will be cut for a four-masted schooner for the John S. Emery Co. of Boston. The firm also has a contract for a four-masted schooner for Capt. Theophilus Bennett, of Baltimore.

The New England Ship Building Co., Bath, recently closed a contract for a four-masted schooner of 1,200 tons, for James B. Drake of Bath. This company leads off in the amount of tonnage launched this year, the following vessels having been sent overboard: barge, Florrie of Boston, 1,086 tons; schooner Hope Sherwood of Providence, 686 tons; schooner Frederick A. Duggan of Mattawan, N. J., 1,137 tons; barge Hattie of Baltimore, 1,286 tons.

Elwel S. Crosby has launched the four-masted schooner John B. Biemiller, 1,077 tons, and has the keel stretched for another of similar capacity.

The schooner Florence M. Penley is the only vessel launched thus far from the Percy & Small yard. She is of 1,154 tons. She is being followed by the five-masted schooner recently purchased on the stocks by William F. Palmer of Dorchester, Mass., and which is fast nearing completion.

The veteran ship builder, Gardiner G. Deering, launched a vessel the first of the year, named in his honor, with a gross tonnage of 1,982 tons.

Frank S. Bowker of Phippsburg Center launched the three-masted schooner Doris of 382 tons last April and has orders in hand for two other vessels of similar size.

With the launching of the five-masted schooner Kineo the yard of Arthur Sewall & Co., Bath, was closed owing principally to the high price of steel. The Sewalls intend to open the yard in the fall for the building of a large steel schooner.

## WORK AT FORE RIVER.

Mr. Thomas A. Watson, president of the Fore River Ship & Engine Co., Quincy, Mass., when asked whether the ship building business is better or worse than it was a year ago said in reply that he could only answer for his own yard.

"Owing to the fact that the New York, New Haven & Hartford Railroad has given us several large contracts," he said, "and that we have also taken a contract to build another battleship, Fore River is much busier than it was a year ago. In regard to the prospects for future business, I think we must depend largely on the extension of the navy unless congress does something to encourage the upbuilding of a merchant marine."

When asked what place New England would occupy in the ship building world five years hence, as compared to the present, Mr. Watson said: "I know of no reason why New England should not maintain the same supremacy in ship building that it has in other mechanical avocations. In my judgment New England is the national home of ship building."

The total tonnage displacement of new vessels at Quincy Point, built or contracted for up to the present time, is 82,500 tons. Last year the output in tonnage displacement was 12,000, including the seven-masted steel schooner Thomas W. Lawson and two steel car floats for the New York, New Haven & Hartford Railroad. The present capacity of the yard is reckoned at 40,000 tons a year of merchant work, but owing to the delays in government work the output for the present year will probably not exceed 25,000 tons. The launching of the Lawson last July, of the United States protected cruiser Des Moines last September and of the two big car floats in November indicate something of what has been accomplished within the past year. The Fore River yard still keeps ahead in the construction of battleships of the 15,000-ton class. On June 1 the New Jersey and Rhode Island, now building there, were estimated by the United States naval constructor in charge to be 37 per cent. completed, which is a gain of 5 per cent. over their condition May 1, and puts them 5 per cent. ahead of any of the other vessels of the same class building in other yards, the Virginia being the nearest to them. The contract price of these vessels is \$3,405,000 each. The hull of the six-masted steel schooner William L. Douglas, which is being built for the Crowley fleet, is all plated, and the work is being rushed in order to get the vessel off the ways next month. Her length over all is 339 ft. 6 in., length on water line 306 ft., beam 48 ft., load draught 24 ft., and her displacement 7,000 tons. The keel plates for the Fall River Line passenger steamer have been laid, and the freight boat for the same line is well under way. The expense of building the passenger boat will be about \$1,000,000, and that of the freighter nearly \$500,000. The passenger

steamer will measure 397 ft. over all. The freighter 318 ft. The only vessel contracted for and not actually begun is the 16,000-ton battleship Vermont, which represents the latest type of American sea fighter. She will be 456 ft. 4 in. over all.

## IN THE BANGOR DISTRICT.

After the launch of the three-masted schooner Grace L. Bartlett in 1890 there was no ship building in the Bangor district until last year, with the exception of small craft. The laying of the keel of the four-master Samuel W. Hathaway in the yard of E. and I. K. Stetson in Brewer, in the spring of 1902, and the launch on Oct. 3 last, marked the revival of ship building in this district, which promises at this time to continue. The Hathaway was of 1,030 gross tons and cost about \$65,000. Following the launch of the Hathaway, the Stetson's began work on four United States government coal barges. The contract price for the four was \$29,000. They were alike, 86 ft. long, 29 ft. wide and 9 ft. deep, with a superstructure which contained the pockets, the load of 250 tons being all on the deck. The barges were delivered at the naval coaling station at Lamoine in June.

Early in June last the keel was stretched for a four-master of about the same class as the Hathaway, but slightly larger. She is now in frame, and will be launched in September. She will be named the Horace A. Stone. Early in the spring Barbour Bros. launched the wooden propellor Verona, with one exception the largest steam craft ever built in Brewer. She is 110 ft. long, 28 ft. beam and 150 tons gross measurement. A 40-ft. screw steamer named Bon Ton No. 2 was launched about the same time for use on the Bangor & Brewer ferry. A special undertaking in a ship building way at this place was the building of a 104-ft. steam yacht for F. W. Ayer, costing about \$50,000, almost entirely from the facilities of the paper mill plant of the Eastern Manufacturing Co. at South Brewer. The craft was built of hard pine and her engines were made in the machine shops of the company. She was named the Helena. There has been a brisk business in small lake steamers and naphtha launches, and about a dozen have been turned out by Brewer boat builders during the past two years.

## IN THE WALDOBORO DISTRICT.

The ship building record of the Waldoboro district for the last fiscal year will make a very favorable comparison with any of recent years and the work on the stocks is indicative in some measure of old-time prosperity. Rockland's record of new vessels launched for the year ending July 1, 1903, is as follows: Schooner William Bisbee, 309 gross tons, built by I. L. Snow & Co.; schooner Minerva II, 597 tons, built by Cobb, Butler & Co., and afterward transferred to trade among the Philippine islands; steam yacht Wenonah, 58 tons, built by I. L. Snow & Co.; steamer Monhegan, 367 tons, built by Cobb, Butler & Co. This represents a total tonnage of 1,331, with a total value of \$95,000, which is exclusive of the value of the machinery now being installed in the steamer Monhegan at Portland.

The value of the shipping built at Rockland in the more recent years is given in round numbers as follows: 1899, \$46,000; 1900, \$184,000; 1901, \$100,000. Prior to these years ship building was practically a forgotten industry at Rockland for quite a period.

At present Cobb, Butler & Co., Rockland, are working on two four-masters, one of which will be about 700 tons and the other about 1,800 tons. The firm also expects to build a steamboat of about 300 tons this season. I. L. Snow & Co., Rockland, have stretched the keel of a schooner which will be about 500 tons. M. H. Reed of Stonington is preparing to establish a ship yard in Rockland, and has a contract for a vessel of 300 tons, which will probably be built this summer.

At Thompson, during the fiscal year, Washburn Bros. launched two large schooners, the Harry T. Hayward, 1,200 tons, and the Washington B. Thomas, 2,600 tons. The combined cost of the vessels was \$188,000. The Washburns have the keel laid for another four-masted schooner of about 1,300 tons, Dunn, Elliott & Co., Thomaston, have the keel down for a three-master of 400 tons, and will also build a four-master of 1,400 tons this year. Waldoboro launched two large schooners during the year, the Paul Palmer, 2,193 tons, and the Dorothy Palmer, 2,872 tons. Both were built by George L. Welt for William F. Palmer and others of Boston. Their combined cost was about \$260,000. Mr. Welt now has on the stocks the schooner Singleton Palmer of about 2,500 tons, and the frame for another five-master of about the same size. At Bristol A. & M. Gamage launched the steamer Newcastle, 83 tons. At Port Clyde William A. Moody is building a tugboat for Boston parties.

The combined tonnage of the vessels which have been launched as above described was 10,379 and the total value was \$550,000. There should be added to this list about twenty small vessels, mostly sloops, aggregating about 175 tons, and valued at \$4,000.

## AT ESSEX AND PORTLAND.

The three ship yards at Essex, employing 200 men, have within three years built 150 fishing vessels from 45 to 130 gross tons. The gross tonnage last year was 4,000, an increase of 20 per cent. Owing to the high price of lumber and the advance in wages the cost of fishing vessels has advanced considerably the past year. Oxner & Story, Essex, Mass., during the past year built sixteen fishing vessels, costing \$139,700.

Ship building at Portland, Me., has been revived by the Portland Ship Building Co. The company is now at work upon two tugs for the Commercial Wharf Towboat Co. of Boston.

### LARGE IMPORTS OF IRON AND STEEL.

Importations of iron and steel into the United States in the fiscal year 1903 are larger than in any preceding year since 1891, and with that single exception are larger than at any time within the past twenty years. In only seven earlier years in the history of the country have the importations of iron and steel been as large as those of the fiscal year just ended. The total value of iron and steel imported in the fiscal year ended June 30, 1903, as shown by the figures of the government department of commerce and labor, is \$51,617,312, against \$27,180,247 in 1902, \$17,874,789 in 1901 and \$12,100,440 in 1899. Running back through the import record from 1850 down to 1903, the only years in which the value of iron and steel imports exceeded those of 1903 are 1872, when the total was \$55,540,188; 1873, 59,308,452; 1880, \$53,714,008; 1881, \$60,604,477; 1882, \$67,976,897; 1883, \$58,495,246, and 1891, \$53,544,272. These large importations of iron and steel have occurred in periods of exceptional business activity, but on no former occasion have such large importations been made in the face of so great home productions of iron and steel. In 1891, when the importations were \$2,000,000 greater than in the year just ended, the total home production of pig iron was only 8,500,000 tons, while that of 1902 was over 17,000,000 tons, or double that of 1891. In the period from 1880 to 1883, when the importations of iron and steel were larger than those of 1903, pig iron production only averaged about 4,000,000 tons per annum, or less than one fourth the annual production of the present time; and in 1872 and 1873, when the importations slightly exceeded those of 1903, the pig iron production averaged only 2,500,000 tons annually, against 17,000,000 at the present time.

The increase is chiefly in the partially-manufactured grades. Pig iron increased from 158,000 tons in 1902 to 956,000 tons in 1903, the value being in 1902 less than \$3,500,000 and in 1903 nearly \$17,000,000. Bar iron increased from 24,500 tons in 1902 to 48,000 tons in 1903, and steel ingots, blooms, slabs, billets and bars from 101,000 tons in 1902 to 425 tons in 1903. The one class of importations of iron and steel which shows a marked reduction is tin plates, of which the total importation fell from 95,000 tons in 1902 to 52,000 tons in 1903, and the value from \$6,000,000 in 1902 to a little over \$3,000,000 in 1903.

Bids were opened at Washington this week for the construction of a dry dock at the Norfolk navy yard. The lowest bid was that of John C. Rogers, of New York, \$910,000. The Continental Jewell Filtration Co. of New York, John Pierce of New York, P. J. Carlin of Brooklyn and Edward F. Ponder of Philadelphia also submitted bids.

Frank Barnett is the name of a four-masted schooner launched from the George A. Gilchrist yard at Belfast, Me., on Tuesday last for McQuesten Bros. of Boston. Her length is 191 ft.; beam, 37 ft. 6 in.; depth, 19 ft. 4 in.; net tonnage, 744 and gross 853.

### LAUNCH OF TURKISH CRUISER MEDJIDIA.

Probably no vessel was ever launched in the United States under more impressive circumstances than the Turkish cruiser Medjidia at Cramps, Philadelphia, last Saturday. This vessel is the first warship ever built in the United States for the Ottoman empire. The sponsor for the new addition to the sultan's navy was Mrs. Edwin S. Cramp, who broke the customary bottle of champagne across the vessel's bows, thus evading the edict of the Koran which forbids a Mohommedan woman from participating in a christening where wine is used. When the Medjidia glided down the ways, grouped about the christening platform were a dozen Turkish officials. They included Chekib Bey, Turkish minister to the United States; his two sons, Ali Bey and Osman Bey, Djelal Munif Bey, first secretary of the Ottoman legation; Sidkey Bey, consul at New York; his secretary, Selim Bey; Halid Bey, and Bahadin Bey, besides Lieut. Com'dr Sabri Bey, and Lieut. Ali Bey of the Turkish navy, inspectors of machinery and hull

construction respectively, on duty at the ship yard for the Sultan. Other distinguished visitors were Commander Alexandere Boutakoff, naval attache of the Russian Embassy at Washington; Representative T. S. Butler; Senator Don Gonzalo de Quesada, minister from Cuba; Rear Admiral Charles O'Neill, United States navy; Capt. C. D. Sigsbee, commandant at the League Island navy yard; Capt. C. F. Goodrich of the same station; Capt. J. F. Hanscom, United States navy; Major Charles H. Lauchheimer, United States marine corps, at Washington; Capt. William S. Moore, United States navy, and Com'dr William J. Baxter, United States navy, both stationed at Cramps' ship yard; Representative H. C. Loudenslager of New Jersey; Judge and Mrs. John B. McPherson, and various city officials.

In 1900 Ahmed Pasha, chief engineer of the Ottoman navy, came to this country for the purpose of examining the American system of naval construction. As a result of his investigation, the Turkish government contracted with the Cramp company for the construction of



Launch of Turkish Cruiser Medjidia at Cramps, Philadelphia.

[Photograph by W H Rau.]

the warship Medjidia, which is of the protected-cruiser type. The general dimensions and characteristics of the vessel are as follows: Length on load line, 330 ft.; beam, extreme, 42 ft.; draught, mean, 16 ft.; displacement, 3,200 tons; speed, 22 knots. The armament consists of two 6-in. rapid-fire guns, four 7-in. rapid-fire guns, six 3-pounder rapid-fire guns, six 7-pounder rapid-fire guns, one 3-in. field gun and two torpedo tubes for 14-in. Whitehead torpedoes. The battery is capable of firing 584 lbs. of projectiles at one round of all guns. Using the standard rate of firing for guns of similar caliber the total discharge of all guns in one minute would be 5,000 lbs. The maximum thickness of the protected deck over the space occupied by the engines and boilers is 4 in. Otherwise the vessel is unarmored with the exception of the conning tower and tube leading to the protected deck. Each of the larger guns is provided with a shield for the protection of the crew. The vessel is provided with a strong ram at the bow, strengthened by the protective deck, which forms an integral part of the ram. The engines are two in number, of the inverted triple-



expansion type, driving twin-screws. The engines are capable of developing upward of 12,000 H. P. The boilers are of the improved Niclausse type.

#### DELAWARE RIVER SHIP BUILDING.

Philadelphia, July 29.—Saturday was an eventful launch day on the Delaware. The Cramps launched the Turkish cruiser Medjidia, the New York Ship Building Co. put the Pacific Mail liner Mongolia over board, and at the works of the Neafie & Levy company an ocean-going tug, the Freehold for the Central Railroad of New Jersey, slid into the water. All of these vessels have been described at length in the Review. The special event at the Cramp works attracted many well-known naval officers and other distinguished government officials, while at the Camden works the gathering was especially representative of the steamship lines and the concerns that have to do with the merchant shipping of the country. Starting with President Griscom of the International Mercantile Marine Co. (the big Atlantic combination), it would seem that among the guests might be counted some one from almost every shipping concern known on the Atlantic seaboard, and representatives of the other ship yards were also quite numerous. Not counting for the present the two big Hill Pacific liners under construction at New London, Conn., as they are far from completion, the Magnolia is the largest ship ever built in the United States. She is to ply between San Francisco, the Hawaiian islands, China and Japan. Her sister ship, the Manchuria, will be launched in October. Both vessels were designed for the Atlantic Transport Co., but during construction were sold to the present owners. The vessel was christened by Miss Lucy Bell Kennedy, daughter of Julian Kennedy of Pittsburgh, who is well known in engineering circles throughout the country and who is interested in the ship yard. Dimensions of the Mongolia are 615 ft. length over all, 65 ft. beam, 51 ft. depth of hold, with a displacement of 26,530 tons, and a dead weight carrying capacity of 14,000 tons. Her quadruple-expansion engines will develop about 12,000 H. P., and the average speed will be about 16 knots. Her boilers are of the Scotch type, four double-ended and four single-ended. She is a five-deck vessel, with a complete shelter deck and a large bridge house amidships on this deck, and will accommodate about 350 first-class passengers, 68 second-class and 1,300 steerage passengers. The Mongolia is rigged as a four-masted schooner, and fitted with powerful cargo gear for the rapid handling of freight. She is being built for the highest class in the Record of American & Foreign Shipping and in Lloyd's Register.

The third vessel launched Saturday was the steel tug Freehold at the works of the Neafie & Levy company.

The new steel tugboat Freehold was launched at the Neafie & Levy Co.'s yards. The Freehold is being constructed for the Central Railroad of New Jersey and is a sister boat to the Flemington, launched recently at the same yard. The Freehold is an ocean-going tug but will be used largely in New York harbor and the Sound. She is 109 ft. long, 24 ft. 6 in. broad and 14 ft. depth of hold. She is fitted with steam steering gear, electric light and all the latest improvements designed for craft of her type. President Mathias Seddinger, Superintendent Smith, several officials of the Central Railroad of New Jersey and a few invited guests were present at the launch. Another tug built for the Central Railroad of New Jersey, the Montclair, left the Dialogue ship yard, Camden, a few days ago on her way to New York, having been formally turned over to and accepted by her owners.

Vice-President and General Manager Sommers N. Smith of the Neafie & Levy company took an actual hand at ship building a few days ago when he laid the keel of the new quarantine boat awarded the ship building company by Pennsylvania. It is to cost \$35,000 and will be named the Governor Pennypacker.

At the meeting of representatives of the Harlan & Hollingsworth Co., its creditors and James Smith, Jr., receiver of the United States Ship Building Co., and who is also ancillary receiver of the Harlan & Hollingsworth Co., held at Wilmington on Thursday last, the following proposition was advanced looking toward a settlement of the ship company's financial difficulties:

"The ancillary receiver of the United States Ship Building Co. for the district of Delaware will apply to the United States court for an order authorizing him to retain possession of, use and dispose of the assets lately in control of the Harlan & Hollingsworth Co., including all of the material and supplies now at the plant, work in course of construction, cash, accounts and bills receivable, due or growing due, and to carry on such business as a going concern. The United States court shall be asked to make a further order directing that the assets and the profits of the Wilmington business shall be used for the payment primarily of the creditors of the Harlan & Hollingsworth Co. That the creditors of the Harlan & Hollingsworth Co. shall extend the time of the payment of their claims until Aug. 1, 1904, provided that all claims shall draw interest at the rate of 6 per cent. per annum from their maturity. That the creditors shall appoint from their number a committee who shall co-operate with the ancillary receiver and the officer of the Harlan & Hollingsworth Co. in carrying out this plan."

The creditors accepted the proposition and appointed the following committee to co-operate with Receiver Smith in carrying the proposition into effect: J. S. Thompson, Lewis Thompson and A. P. Swoyer of Philadelphia; George S. Capelle and Howard T. Wallace of Wilmington. It developed during the

meeting that the Harlan & Hollingsworth Co. has over \$1,000,000 worth of work on hand; that it is making money and can be kept in operation and pay its debts without trouble under the plan adopted. The board of trade of Wilmington exerted its influence to aid the company and the citizens generally are friendly to it and hope soon to see it out of its embarrassment.

The steamboat Penn, built by the Harlan & Hollingsworth Co. for the Baltimore & Philadelphia Steamboat Co. (Ericsson Line) has finished her trials, which were highly satisfactory, and has been turned over to her owners. She is looked upon as the fastest steamer on the Delaware. Her sister boat, the Lord Baltimore, is almost ready for her trial and will also be a speedy vessel. The steel yacht Vegemere, built at this yard for J. A. Bostwick of Boston, was launched a few days ago. It is the finest yacht ever built by the company. The Harlan & Hollingsworth Co. will build a ferryboat for the department of commerce and labor, to run between Manhattan and Ellis Islands for the transportation of emigrants, in the place of the John G. Carlisle. She will be larger than the old boat and have a screw at each end.

The Standard Oil Co.'s steamer Schuylkill, Capt. Nicholas, made a record for carrying oil last week. The Schuylkill's dimensions are 412 ft. length, breadth 52 ft., and 30 ft. 6 in. depth; carrying capacity, 8,400 tons, dead weight. She is a British vessel, built by Russell & Co., Port Glasgow, in 1903. She loaded 200,000 cases of refined petroleum at Philadelphia, and proceeding over the shoals of the Delaware to deep water, took on 50,000 additional cases and cleared for Japan.

There were no responses to the government's call recently for draughtsmen for the naval service in the Philippines. Draughtsmen of the ability necessary to pass the examinations can earn elsewhere twice the salary offered by the government, without the hardships of service abroad and hence they were not attracted by this last call. As a result the examinations have been postponed.

The Ajax Metal Co., well known in marine circles, is still further enlarging its works at Richmond street and Frankford avenue, having just awarded to Mitchell Bros. a contract for the erection of a foundry. The building is to be one-story brick, 138 by 80 ft., and is to cost \$23,000.

Estimates are being received for the erection of a new building for the Delaware Steel Casting Co. at Chester, Pa. The building is to be of brick, 300 by 500 ft.

#### PIG IRON STATISTICS.

The American Iron & Steel Association has received from the manufacturers complete statistics of the production of all kinds of pig iron in the United States in the first half of 1903; also complete statistics of the stocks of pig iron which were on hand and for sale on June 30, 1903.

The production of pig iron in the first half of 1903 was 9,707,307 gross tons, against 8,808,574 tons in the first half of 1902 and 9,012,733 tons in the second half of 1902. The increase in production in the first half of 1903 over the second half of 1902 was 694,634 tons. The united production of the second half of 1902 and the first half of 1903 amounted to 18,720,100 tons.

The production of Bessemer pig iron in the first half of 1903 was 5,480,619 gross tons, against 5,105,932 tons in the first half of 1902 and 5,287,236 tons in the second half of 1902. The figures for the first half of 1903 include 80,723 tons of low-phosphorus pig iron, against 81,818 tons in the first half of 1902 and 82,428 tons in the second half of that year.

The production of basic pig iron in the first half of 1903 was 1,203,803 gross tons, against 1,053,274 tons in the first half of 1902 and 985,316 tons in the second half of 1902. Basic pig iron made with charcoal is not included in these figures.

The production of charcoal pig iron in the first half of 1903 was 232,717 gross tons, against 186,098 tons in the first half of 1902 and 192,406 tons in the second half of 1902. In addition there were produced in Wisconsin and Washington in the first six months of this year 927 tons of pig iron with mixed charcoal and coke.

The production of spiegeleisen and ferromanganese in the first half of 1903 was 110,675 gross tons, against 118,982 tons in the first half of 1902 and 93,999 tons in the second half of 1902.

The production of bituminous coal and coke pig iron in the first six months of 1903 amounted to 8,401,001 gross tons, of anthracite and coke mixed to 1,046,461 tons, of anthracite alone to 26,261 tons, of charcoal to 232,717 tons, as above stated, and of charcoal and coke mixed, also above noted, to 927 tons.

The association's statistics of unsold stocks do not include pig iron sold and not removed from the furnace bank, or pig iron manufactured by rolling-mill owners for their own use, or pig iron in the hands of consumers. The stocks which were unsold in the hands of manufacturers or their agents on June 30, 1903, amounted to 126,301 tons, against 49,951 tons on Dec. 31, 1902, and 30,861 tons on June 30, 1902, the latter figures including 1,000 tons in the yards of the American Pig Iron Storage Warrant Co. which the manufacturers did not control. No pig iron was stored in the yards of this company on June 30, 1903, or on Dec. 31, 1902.

The whole number of furnaces in blast on June 30, 1903, was 320, against 307 on Dec. 31, 1902, and 286 on June 30, 1902. The number idle on June 30, 1903, was 101. Of the active furnaces on June 30, 1903, 226 used bituminous fuel, fifty-three used anthracite coal and coke mixed, four used anthracite coal alone, and thirty-seven used charcoal alone.



### HIGH WATER AND BIG CARGOES.

Duluth, Minn., July 29.—It is thought at the offices of the Pittsburgh Steamship Co. in this city that the steamer Wm. Edenborn, one of the "big four" of the lakes, which has been breaking her own best records in the ore carrying trade almost every trip of late, will move 8,000 gross tons before the present period of high water is over with. This would mean practically 9,000 net tons. The increase in cargoes is not confined to the big boats. All the ships of the lakes that are capable of loading below 18 ft. are carrying larger cargoes than they have ever carried before. The new Provident steamer James H. Reed, just out, took her first cargo, 7,538 gross tons, Sunday at the D. M. & N. docks. She is the largest of the new ships that have hatches in great number spaced 12 ft. centers.

Stocks of wheat here are smaller than they have been at any time since August, 1898. Then the total was only 388,000 bu. It is probable that this week will see the stocks reduced to a smaller amount than the 1898 figures. Shipments are going forward steadily though slowly, and entirely on line boats. The liners have not enough flour to carry and are filling out with wheat. It is safe to figure the shipments of flour from the head of the lakes at about 50 per cent. of what they were a year ago, and the reduction is, of course, cutting off line business severely. Wheat freights are very dull, and nothing is going for export. In fact export lines are out of this market almost completely, for this season. Of the wheat in store here only 272,000 bu. is contract grade. Evidently there are many short July sales yet unsettled, and the grain with which to settle is very hard to get. For that reason cash wheat here is now selling at 8½ to 9 cents above September and the market is strong at this premium. The situation has the elements of a small corner. There is no possibility of getting in any quantity of wheat to fill these sales, for the demand is even stronger at Minneapolis than here.

On Saturday more than 475,000 gross tons of ore was stored in docks and in cars at dock terminals at Duluth, Two Harbors and Superior awaiting boats. There seems to be delay with shipping and at lower lake receiving ports all the time, and this is especially aggravating at this season. Mines are compelled to slacken up on account of congested docks.

One of the suction dredges of the Lake Superior Dredging & Contracting Co. is to be sent to Buffalo for harbor work. There is very little dredging at the head of the lakes this year, as the big government work is completed and there is not much going on in the way of private improvements. One sand dredge is making the basin for the concrete pier at the Superior entry and one or two others are deepening channels.

The old harbor tug Joe Dudley, of Duluth, has been sold to Jas. Whalen of Port Arthur, Ont., for towing and fire boat purposes and will be fitted with pumps and fire appliances at once. The boat has been on Lake Superior twenty-five years.

### MR. CLERGUE FORMALLY RETIRES.

Mr. F. H. Clergue, originator of the group of enterprises which bear his name at Sault Ste. Marie, has retired altogether from active management in connection with them. Announcement to that effect was made last week. He will devote his entire time to the Canada Central Railway. This line is not a part of the Consolidated Lake Superior Co.'s group of enterprises, but a traffic arrangement will be made between it and the Manitoulin & North Shore Railway, which is one of the properties of the Consolidated company. The severing of Mr. Clergue's connection as the general manager of the Sault Ste. Marie power canal enterprises is a matter of much interest. It is almost a foregone conclusion that had there been no Clergue there would have been no such assembly of industrials at Sault Ste. Marie. He went there in 1894 and recognized at once the enormous power that was running to waste. He recognized also that lying north of him was practically virgin territory that possessed great possibilities of wealth. It was genius to enlist capital to convert Lake Superior into a mill pond and to penetrate the Canadian wilderness with a railway. Certainly money poured into Clergue's treasury by millions and it poured out in an equal stream. With great rapidity power canals were constructed, and factories, mills and railways were built. The structures were built to last, for they are among the most magnificent in the country. But spending money and making money are different things. Clergue's talents, being more constructive than managerial, the directors have seen fit to put another man at the head of the enterprises. But the name Clergue will continue to cling to the works.

During the month of June the four Hulett clamshells at Conneaut moved 384,000 tons of ore, or an average of 3,900 tons per machine per day. This is the best record yet attained.

### CHICAGO GRAIN SITUATION.

Chicago, Ill., July 29.—The freight market here has of late been so lacking in features of interest that there is little satisfaction in writing about it. This week I am simply making an extract from a letter on the subject sent out from one of the vessel agencies, P. H. Fleming & Co. It is to the point and covers the situation. It is as follows:

"We are experiencing very dull conditions, about as dull as anything we have seen for a long time past, but as no changes have taken place in rates, it may be well to look upon the hopeful side of the situation. Outside vessels have been turned pretty much for Lake Superior and the various ore loading points, leaving the liners to pick up such business as is going from day to day. Business has been almost entirely confined to moderate-sized lots for account of line boats, but the rate basis is the same as last reported—1¼ cents wheat, 1½ cents corn and 1 cent oats for Lake Erie, Port Huron and Georgian bay points. The situation closely reflects that of a year ago when rates ruled slow at 1½ cents wheat and 1 cent corn for Buffalo, with the prices of wheat 72 to 75 cents, C. I. F. Buffalo, and corn 62 to 65 cents, compared with the present grain prices of about 80 cents wheat and 54 cents corn. What is required for a better state of shipping conditions appears to be the adjustment of a shipping basis suited to ideas of both the eastern and western end, and with little or no movement of grain at this time. This, of course, will gradually work around in the natural order."

The usual tables of shipments, lake and rail, are appended herewith:

	Week just clos. d.	Last week	Same week last year.
Wheat, bu. ....	209,567	499,310	314,575
Corn, bu. ....	1,849,793	2,471,362	2,058,118
Oats, bu. ....	1,120,595	1,350,234	587,157
Total .....	3,179,955	4,320,906	2,959,850
	Since Jan. 1, 1903		Same time last year.
Wheat, bu. ....	11,901,303		15,374,677
Corn, bu. ....	46,185,788		21,591,568
Oats, bu. ....	37,597,290		30,612,523
Total .....	95,684,408		67,578,768

Stocks of grain in elevators again show a slight decrease. The latest summary follows:

	Week just closed	Last week.	Same week last year.
Wheat, bu. ....	3,532,000	3,611,000	3,503,000
Corn, bu. ....	6,738,000	7,465,000	6,293,000
Oats, bu. ....	2,298,000	2,063,000	369,000
Rye, bu. ....	292,000	339,000	134,000
Total .....	12,860,000	13,478,000	10,699,000

### GRAIN FROM NORTHWESTERN CANADA.

Port Arthur, Ont., July 29.—Grain receipts and shipments at Port Arthur and Fort William for the year ended with June, 1903, have been as follows:

	Port Arthur		Fort William		Total	
	Receipts	Shipments	Receipts	Shipments	Receipts	Shipments
Wheat, bu.	9,871,055	9,522,975	28,893,738	28,128,571	38,764,793	37,651,546
Oats, bu.	128,050	81,834	1,121,816	819,772	1,249,866	901,606
Barley bu.	174,769	124,897	59,602	70,324	234,371	195,221
Flax bu.	149,896	120,011	.....	.....	149,896	120,021
Total.	10,323,740	9,849,717	30,075,156	29,018,667	40,398,896	38,868,394

These figures are especially interesting, as they cover the first year in which Northwestern Canada really became one of the world's important grain shipping and exporting centers. There is now in store in elevators at these two points less than 1,500,000 bu. of grain and it is going forward slowly. For the same year 463 ships of 572,873 registered tons arrived at Fort William. The number of boats at Port Arthur was about the same, but the tonnage was much less.

Improvements at these Canadian ports are keeping pace with the growth in grain business. A government dredge has been ordered to work at the mouth of the Kaministiquia (Fort William harbor) to deepen it to 22 ft. in the clear. The channel is also to be widened to 300 feet. The Barnett & Record Co. has contracted with the Hines Lumber Co. at Duluth for 8,000 long piles to be delivered at Port Arthur within thirty days. This is one of the biggest contracts of the kind made for a long time and the quickest possible delivery is required. The piling is for foundations of the new working house and tile storage which the Barnett & Record Co. is to build for the Canadian Northern road.



The capacity is to be about 4,000,000 bu. Contracts for taking the timber across Lake Superior to Port Arthur have already been let to Whitney Bros. and delivery at the lake has commenced.

DULUTH GRAIN SITUATION.

G. A. Tomlinson, vessel owner and vessel agent, Duluth, says:

"The grain freight market will display no activity for at least a month. There is in store about 2,000,000 bu. of flax but very little other grain, and the requirements of the railroad liners will consume the current surplus. The new crop is two weeks earlier than last year. Wheat will begin moving from the Dakotas late in August; flax a fortnight later; barley about the middle of August. The yield of barley promises to exceed last year. The flax crop will be about the same as last year, and it seems likely we have produced less wheat in the three northwestern states. Minneapolis mills promise to use southwestern wheat largely, so that Duluth will doubtless receive large consignments from South Dakota. I am of the opinion, therefore, that Duluth will ship as much wheat as in 1902. In Manitoba there is an increased area but the condition of the crop does not suggest more bushels than in 1902. This crop is also very early and should be moving freely by the middle of September. The marketing of all cereals will depend largely on weather conditions during harvest time. Prices indicate the farmers will sell their products promptly.

"About 50 per cent. of the bituminous coal requirements have been received. Most of the docks are filled but liberal rail shipments of coal will occur in August."

DREDGING IN CONNECTING LAKE CHANNELS.

The Lake Superior Contracting & Dredging Co. of Duluth and Wm. E. Rooney of Toledo were found to have submitted the lowest bids for the use of their dredges when Major W. H. Bixby, United States engineer at Detroit, opened bids, a few days ago, for time-work dredging in Lake St. Clair, St. Clair river and at the foot of Lake Huron. This is a continuation of the 20-ft. channel work and the excavation will be of 1 to 3 ft. thickness of river bed material at depths of from 20 to 23 ft. below the water surface, including occasional boulders and wrecks or other obstructions that may be encountered. About 1,600 hours will be required to complete the work and the expenditure will amount to about \$80,000, of which about \$38,000 will go to the Duluth concern and about \$42,000 to Rooney. The bids were as follows:

For Work in	Price per hour	Capacity of Dredge per ft. cu. yds.	Equivalent Rate per cu. yd.		
			Lake Huron Cents	St. Clair River Cents	Lake St. Clair Cents
Edward Bros. } Sault Ste Marie }	Lake Huron	\$15.75	80	19.7	...
	St. Clair River	14.75	80	...	18.4
	Lake St. Clair	14.75	80	...	18.4
Lake Sup. Cont. & } Dredg. Co., Duluth }	Lake Huron	\$24.00	200	12.0	...
	Lake Huron	18.00	80	22.5	...
	St. Clair River	18.00	80	...	22.5
*M. Sullivan, Detroit	Lake St. Clair	18.00	80	...	22.5
	Lake Huron	24.00	100	24.0	...
	St. Clair River	22.00	100	...	22.0
*M Sullivan, Detroit	Lake St. Clair	22.00	100	...	22.0
	Lake Huron	18.00	100	18.0	...
	St. Clair River	\$11.75	100	...	11.75
Wm. E. Rooney, Toledo	Lake St. Clair	\$14.00	100	...	14.0
	Lake Sup. Cont. & } Dredg. Co., Duluth }	St. Clair River	\$24.00	200	...
	Lake St. Clair	24.00	200	12.0	...
Carkin, Stickney } & Cram, Detroit }	Lake Huron	31.50	100	31.5	...
	St. Clair River	27.50	100	...	27.5
	Lake St. Clair	29.50	100	...	29.5

a, b, c, Lowest bid  
\*First bid with dredge Old Glory, second bid with dredge Gladiator.  
\*Company's dredge No. 2 for Lake Huron work; dredge Port Huron for St. Clair River work. Wm. E. Rooney will use dredge Birkhead.

The distribution of the work will be about as follows: Shoals in the St. Clair river, 50 per cent. of the whole; foot of Lake Huron, 20 per cent.; in Lake St. Clair near the foot of the canal, in mid lake and near the head of the Detroit river, 30 per cent. In the St. Clair river the principal work will be involved in removing the shoal opposite the mouth of Black river, near Port Huron. Other shoals to be removed in this river are Stag island shoal in the American channel, St. Clair shoal, near St. Clair, Mich., and Squirrel island shoal, about 2 miles below Grande Pointe, Mich.

The fifth order light of the Sturgeon Bay canal pierhead light station has been moved to and established, without change in characteristic, in the structure recently erected at a point 14½ ft. SE. ½ S. from its present location, on the outer end of the north pier at the entrance to the harbor of refuge. The height of the light has been increased from 35 ft. to 40 ft. above lake level. The fog signal will be moved to the new structure as soon as practicable, and the old buildings will then be removed.

Surveyors who are recording the height of spars of lake vessels at Detroit and Walkerville, preliminary to the work on the proposed international bridge across the Detroit river, have found the spars of the schooner John Kelderhouse to be the highest—151 ft. 9 in.

MAJOR BIXBY'S REPORT.

Maj. W. H. Bixby, government engineer at Detroit, has just filed his annual report with the secretary of war. He asks for appropriations aggregating \$1,914,000 for new work and continuance of improvements now under way. For the movable dam and acquisition of property for improvements on the St. Mary's river at the falls, the Sault canal and other contingencies, it is estimated that \$525,000 will be needed, and the widening of the canal entrance above the locks will take \$1,050,000 more. There is now available \$611,000, so that congress will be asked to appropriate \$964,000 in the next river and harbor bill. For the further improvement of Hay Lake and Neebish channels \$500,000 is asked for from the sundry civil bill, in addition to the \$1,344,502 now available. For lower Detroit river improvements, over the Lime Kiln crossings, etc., Maj. Bixby asks for \$450,000 in the sundry civil bill, in addition to the \$942,000 now available. It is estimated that the improvement will cost \$800,000 more than is available at this time. Speaking of the improvement in St. Mary's river, Maj. Bixby says:

"During the past fiscal year the bends of the channel were widened at Sailor's Encampment and Little Mud lake, the total amount of matter dredged being 129,675 cu. yds., and the gain in width at bends averaging over 100 ft. The result of the work was to provide at each place work was done a clear depth of 21 ft., where the controlling depth before the improvement ranged from 16 ft. 6 in. to 18 ft. During the past fiscal year there were removed from the St. Clair river section of the ship channel portions of two shoals at Port Huron and Lake St. Clair at the foot of the canal, the total amount of material dredged being 143,566 cu. yds."

HIGH WATER.

Gage records of the United States Lake Survey show the following mean stages of water above mean sea level, for June, 1903:

	Stages during June	Higher than during same month last year.	Higher than during June, 1895.
	feet.	feet.	feet.
Lake Superior	602.37	1.29	0.23
Lake Michigan	580.17	0.10	0.38
Lake Huron	580.05	0.00	0.30
Lake Erie	573.14	0.93	1.48

The present fall, Lake Huron to Lake Erie, is 0.93 ft. less than a year ago.

The old schooner Winslow, last of a once large fleet of lumber carrying craft, sunk in the Chicago river this week and removed another link in the history of lake marine. The Winslow family was one of the first wealthy families owning and operating fleets upon the great lakes. Now all that remains to perpetuate the name is an insignificant old tug, the Winslow, feebly struggling for existence in the waters of Saginaw bay. For years the schooner Winslow has been a familiar bit of the panorama making up Chicago's water front. Denuded of her masts for many years, the old boat's hull has been given over to advertising posters. Before the drainage canal was opened she drifted from dock to dock, but of late years she has been tied up on the south side of the river between State and Dearborn streets, where her water soaked hull found a resting place this week. Deserted by her owners, the Winslow will be provided a final resting place by the city authorities. Harbor Master John McCarthy of Chicago will have tugs drag the old hulk 4 miles into the lake and there sink it.

Col. Bingham, United States engineer at Buffalo, publishes the following warning to vessel men: "The excavation of the Lake Erie entrance channel to Black Rock harbor and Erie basin (extending from the main entrance channel of Buffalo harbor at the south end of the north breakwater, to the Reading coal trestle in Erie basin) has been begun by the United States. This channel is being excavated 400 ft. wide and 23 ft. deep at mean lake level, and at the Erie basin end of the channel (off the north end of the New York state breakwater), the removal of rock is required. The necessary blasting of this rock is liable to raise the blasted rock above the depth of 16 ft. at mean lake level. Mariners are warned of the danger of navigating this channel with vessels drawing over 16 ft. during the progress of the excavation, which will probably not be completed before the close of the navigation season of 1903."

The report comes from Pittsburg that Mr. Charles M. Schwab is to definitely resign his position as president of the United States Steel Corporation. Since Mr. Corey was appointed to perform the active duties of the president's office Mr. Schwab has not been near headquarters once. Of course his definite retirement was presaged in the fact that some one else was appointed to do the work; but now it is announced that his resignation has been reduced to paper. It is expected to be acted upon on Tuesday next. Meanwhile Mr. Schwab's whereabouts are known only to his closest friends. It is further reported that Mr. Corey is to be made the actual president, and that Mr. A. C. Dinkey, at present general superintendent of the Homestead Steel Works, is to be made president of the Carnegie company.

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### CONSOLIDATED LAKE SUPERIOR CO.

**President Shields Issues an Appeal to the Stockholders—The Earnings of the Company Conservatively Estimated.**

President Cornelius Shields of the Consolidated Lake Superior Co. has flatly told the stockholders of the company that unless they come to the rescue and subscribe for the bonds lately offered to them, the entire property must pass into the hands of its creditors. In a circular letter sent to the stockholders he announces that unless the proposed \$12,500,000 bond issue is taken the whole property must be turned over to creditors. The creditors are New York and Philadelphia banks, headed by Speyer & Co. of New York, who hold all available collateral security of the company for three loans aggregating \$5,050,000. President Shields in his appeal says:

"The Consolidated Lake Superior Co. is in a critical condition from which it can be rescued only by prompt and decisive action on the part of the stockholders. By means of the issue of \$12,500,000 of thirty-year 4 per cent. bonds there must be provided the full amount of \$7,500,000 with which to take care of the temporary loans of \$5,050,000 and about \$1,500,000 of current debts. Unless this entire sum can be provided in some way the whole property must pass into the hands of creditors, and forced liquidation, with all of the works idle and unproductive, is sure to result in the sacrifice of a great part of the investment. On the other hand, if the \$7,500,000 can be provided the company will be free of its floating indebtedness, with working capital sufficient to carry on its business, and in a position to earn double the amount of its fixed charges."

Since Mr. Shields took the general management of the Clergue group of industries at Sault Ste. Marie he has made a very businesslike investigation of its affairs and has been very impartial and candid in his statements. His recent report to the directors on the company's condition and prospects gives the following figures as to estimated earnings of the various undertakings for the fiscal year ending June 30, 1904, and the fixed charges to be met during the same period:

Estimated earnings—Helen iron ore mine, \$105,000; steel rail mill, \$400,000; saw mill, \$75,000; veneer mill, \$40,000; pulp mills, \$75,000; Algoma Central steamship lines, \$50,000; Algoma Central & Hudson Railway, \$175,000; Manitoulin & North Shore Railway, \$25,000; street railway and ferry, \$30,000; Michigan Lake Superior Power Co., \$110,000; Lake Superior Power Co., \$20,000; Tagona Water & Light Co., \$35,000; car shops, \$15,000; Grace gold mine, \$15,000; total, \$1,170,000.

Fixed charges—Michigan Lake Superior Power Co., \$175,000; street railway and ferry, \$30,000; Tagona Water & Light Co., \$9,600; town debentures, \$12,423; total, \$227,023.

The foregoing would leave estimated net earnings for the year of \$942,977.

Commenting on these figures Mr. Shields says: "This statement can be accepted as a conservative estimate of the earnings for the coming fiscal year. Any change from these figures are likely to be in the direction of larger earnings rather than a decrease." In a foot note dated July 10, 1903, the president pointed out that two months have elapsed since the report was presented and adds: "It seems only proper to state that the estimates and opinions contained in the report have been abundantly substantiated." Mr. Shields' report is based upon personal investigation. "Everything doubtful," he says, "has been thrown out; estimates of earnings have been graded down to a point that seems to be free from doubt, and estimates of cost have been made high to provide for all possible contingencies."

The condition of the various productive properties of the company is gone into in detail. Speaking of the Helen mine, and of the limits of the ore body on the second or lower levels, Mr. Shields says that it has been demonstrated that the walls of the ore body are not converging so far; on the contrary the walls are practically parallel and probably continue thus to a considerable depth. Continuing he says:

"The quantity of ore above the lower level can be closely calculated, and it is safe to count upon about 700,000 tons thus measured up. Present knowledge of the mine warrants the calculation that every foot of additional depth within the walls now defined will add 7,500 tons to the present ore body. Since the report was written (May 5, 1903) the drill has been put down about 107 ft. below the lower level and is still (July 11, 1903) going in good shape. In three years the Helen mine has shipped 584,000 tons of ore. The ore mined during the winter and on the stockpile at the opening of navigation amounted to 102,841 tons of No. 1 and 44,700 tons of No. 2. The present output is from 1,000 to 1,200 tons per day, which we may be able to bring up to 1,500 tons during the season. We are counting upon the shipment of about 350,000 tons during the season. At 30 cents a ton profit, this should yield a net profit of \$105,000 during the year. This is the mine profit only, transportation being considered separately."

Helen ore is of non-Bessemer grade and will average for the season about 59.00 iron, 0.14 sulphur and 0.10 phosphorus. The company owns several other iron ore prospects on the Michipicoten range of sufficient promise to warrant thorough examination. Since the report was written, at which time the shaft at the Josephine mine was down to about 150 ft., four drill holes have been put down on the Josephine with satisfactory showing of ore that promises to come within the Bessemer limits. On the Mesaba range the company has one-quarter of section 16 (the Woodbridge mine). Only a small portion of this tract has been explored with the drill, but 2,500,000 to 3,000,000 tons of non-

Bessemer ore have been measured up. Despite the Josephine's promise of Bessemer, the company has no Bessemer. It can use part Helen, but will have to buy Bessemer ore for this mixture. It will also be necessary to buy some pig iron to supplement the company's own production in order to run the rail mill to the best advantage. Even under these conditions the company can make a good profit on rails, particularly in view of the \$7 a ton duty and of the bounties on pig iron and steel ingots.

The estimated profits on the steel rail plant—34.2 per cent. of the company's total estimated income—are based on the estimates of Gen. Supt. D. D. Lewis, which have been independently reviewed. The Dominion's increase of the 20 per cent. in bounties will increase profit on steel rails about 87 cents a ton. On this basis the mill cost of rails is put at \$22.47. Interest and depreciation have been allowed at 10 per cent. on \$4,500,000, the investment. The output of rails for the fiscal year is put at 125,000 tons, or 500 tons for 250 days. Allowing \$3.60 per ton for interest and depreciation, makes total cost of rails \$26.07 per ton.

With 20 per cent. of Helen ore at \$2.25, 80 per cent. of old-range Bessemer at \$4.25, coke at \$6 and charcoal at 6 cents a bushel, the cost of charcoal pig iron is figured \$12.66 and coke iron at \$13.13, after allowing for bounties. Two hundred and fifty tons per day coke iron and 150 tons charcoal iron from company's furnaces and 100 tons per day of coke iron from Midland furnace, in which the company has a two-fifths interest (taking their iron at \$20 per ton), the company would have 500 tons daily at average cost of \$14.66 and enough to run the mill. Assuming \$30 to \$31 at mill for rails, which is allowing for only a small portion of the advantage from the \$7 duty, there would be at least \$1 profit, or \$500,000 on 125,000 tons. To be safe, however, Mr. Shields has reduced this 20 per cent. and figured on \$400,000 from the steel rails.

The revenues of the Michigan Lake Superior Power Co. are estimated at \$200,000 for the year—\$100,000 from the Union Carbide Co. and \$100,000 from the Trans St. Mary's Traction Co. The Algoma Central Railway is estimated to earn \$175,000. Other sources of income are discussed in detail, including the Grace gold mine, which has yielded a net profit of \$1,500 to \$1,800 a month, and the large amount of ore on hand assures at least \$15,000 net for the year.

### AROUND THE GREAT LAKES.

Capt. George McLeod has been appointed master of the Great Lakes and St. Lawrence river steamer Crerar.

Capt. George Pierce has been appointed master of the new steamer Leonard of the United States Transportation Co.'s fleet.

The United States revenue cutter Tuscarora, destined for the great lakes, will do duty as guard during the international yacht races.

David Kennedy, an old resident of Detroit, and for many years an engineer on the great lakes, died last week. He is survived by a widow and four children.

Judge Hazel of Buffalo has ordered the sale of the propeller P. H. Brickhead for debts. She will be sold by the United States marshal at Buffalo today (Thursday).

The fueling scow Shawmut, owned by E. L. Hedstrom, was sunk by the Anchor liner Mahoning while fueling the steamer Pawnee at Buffalo last week. The Mahoning was not damaged.

The steamer Visitor, with United States Assistant Engineer Blunt in charge, is engaged in making a resurvey of the harbor entrance and channel at Huron, Lake Erie, with a view to building new piers.

No. 2 dock at the Ship Owners' Dry Dock Co.'s works, Chicago, is being lengthened to 350 ft. This company has begun work on the building of a steel lightship for the government that is to cost about \$35,000.

Maj. Lansing H. Beach is superintending the erection of a new lighthouse at Crisp point, 16 miles west of Whitefish point, on Lake Superior. The equipment for the new light was taken to the site by the tender Amaranth.

Work has been started in Chicago by the Chicago & Great Lakes Dredge & Dock Co. on an immense concrete wharf that will cost the Chicago drainage board \$100,000. The wharf will be 800 ft. long, extending from Madison to Randolph streets along the south branch of the river.

It is announced that the Lumber Carriers' Association, at the monthly meeting of the board of managers in Detroit, Aug. 4, will advance carrying charges to \$2.75 or \$3. Ever since the opening of the season the carriers have said the present \$2.50 rate was too low to make money, but conditions did not warrant an advance.

The Gilchrist steamer John Craig, which sank upon Simmon's reef on June 26, has been given a partial survey in dry dock at Detroit and is found to be in bad shape. The stem is badly twisted, bilge hogged on port side, planking loosened up and will have to be replaced for 60 ft. back. Mr. Gilchrist has abandoned her, as a constructive total loss, to the underwriters.

The wreck of the barge Champion, lying near the head of Russell's island, St. Clair river, has been abandoned by owner and underwriters and will very probably be blown up. The steamer Colby and whaleback 137 grounded last week in trying to find their way around the sunken barge, the light on the head of the island having gone out. The wreck has since been lighted.

Capt. Henry Stone took the new steamer Wilbert L. Smith out of Lorain a few days ago on her maiden trip. Just eleven weeks after the keel of this vessel was laid at the Lorain yard of the American Ship Building Co. she was ready for a cargo. The Smith is one of a half dozen 6,000-ton steamers built within the



past year for the United States Transportation Co. of Cleveland.

More of the big vessels are carrying coal this season than at any time in the increased depth of water now prevailing in lake channels is prompting them to take on large cargoes. Within the past few days the following cargoes have been noted: Sinaloa, 7,173 tons; C. M. Warner, 5,795 tons; Wilkesbarre, 5,727 tons; H. S. Wilkinson, 5,754 tons; M. A. Hanna, 6,705 tons; W. E. Reis, 6,817 tons.

At the annual meeting of the Manitowoc Dry Dock Co., held in Manitowoc a few days ago, the retiring directors were re-elected. No financial statement of earnings for the year was submitted. The board of directors will meet at a later date in Chicago, when it is expected some plan will be formulated for financing the large increase in dock capacity announced by the company some time ago.

Last week the steamer V. Swain, belonging to the Gilchrist fleet, sank at the Duluth & Iron Range dock at Two Harbors. Her pumps could make no headway against the leak which she sprang. She is insured for \$18,000. Mr. Gilchrist, upon the advice of his Duluth agent, abandoned her to the underwriters. This is the third disaster which has been visited upon the Gilchrist fleet during the past few weeks.

Contractors engaged in lengthening the piers at South Chicago have placed two buoys, a red and black spar, in 25 ft. of water, about 2,000 ft. from the present end of the breakwater. Vessels entering South Chicago harbor should pass between these buoys, as it is dangerous to pass between the end of the breakwater and the spar buoy on account of filling stone, which is being placed for the lengthening of the breakwater.

Lieut. Col. Adams, government engineer at Grand Rapids, Mich., has made several recommendations in his report looking to the improvement of ports on the east shore of Lake Michigan. He has recommended an expenditure of nearly \$1,000,000 for improvement work. Muskegon harbor leads with \$253,000. The engineer also proposes to cut a channel through from Kalamazoo and Saugatuck river to Lake Michigan, allowing \$135,000 for the work and \$15,000 for maintenance. Macatawa Park and Ottawa Beach have been recommended as needing an expenditure of \$106,000, and Michigan City will require \$77,665. At South Haven, where large steamers are having so much trouble on account of obstructions in the river, \$15,000 is asked. For St. Joseph \$20,000 has been recommended. Ludington and Manistee will receive about \$15,000 if Col. Adams' recommendations are concurred in. Further appropriations asked are \$20,000 to be expended on the channel at Frankfort, \$31,000 for work at Pentwater and \$33,000 for improvement to the pier at Petoskey.

Vessel interests are desirous that the Bridge street bridge at Ashtabula shall be replaced with a lift bridge. There is a bad turn in the river where the bridge is located and vessels strike it with annoying frequency. The channel at this point is only 100 ft. wide and with vessels tied up at adjoining docks it makes navigation extremely difficult. Capt. W. W. Smith, marine superintendent of the Pittsburg Steamship Co., said at a meeting in Cleveland Tuesday that the large vessels of his fleet had considerable trouble in passing the point and that recently an accident there cost one of his vessels \$2,800. Vesselmen desire the channel widened from 40 to 60 ft. and the bridge replaced. On Wednesday a delegation consisting of Maj. Dan C. Kingman, government engineer, President Livingstone of the Lake Carriers' Association, H. Coulby, Capt. John Mitchell, H. A. Hawgood, Capt. Edward Morton, Capt. W. C. Richardson, Capt. W. W. Smith, F. S. Masten, William Cottrell, J. H. Sheadle and Capt. William Gerlach visited the bridge with a view to determining what best to recommend to the proper authorities.

#### FOR AMERICAN SHIPPING.

The Maritime Association of the Port of New York, commonly known as the Maritime Exchange, has appointed a special committee of five members to ascertain and report to the association, not later than Dec. 1 of this year, by what method American ships, officered and manned by American citizens, may most quickly and effectively secure the major portion of our foreign ocean carrying trade. The committee is authorized to confer and co-operate with similar committees from other organizations appointed for the same purpose. The committee is composed of the following members: A. A. Ravin, president of the Atlantic Mutual Insurance Co.; Harrington Putnam, admiralty lawyer; Ernest C. Bliss of Boulton, Bliss & Dallett, owners of the Red D. Steamship Line; Fields S. Pendleton, ship owner; and Henry E. Nesmith, warehouse owner. As the committee is composed of men in a marked degree representative of American shipping interests, something tangible is looked for from their efforts, and their report will be looked forward to by everybody interested in the welfare of our merchant marine.

In this same connection the New York Board of Trade and Transportation has taken action and appointed a like committee, consisting of Aaron Vanderbilt, 120 Liberty street, formerly of the Ward Line, chairman; D. R. James, importer, 123 Maiden lane; Herman Sielcken, 77 Broad street; Patrick Tarrelly, manager American News Co., 39 Chambers street; Henry A. Rogers, president of the New York Board of Education, 19 John street, and Oscar S. Straus, president of the New York Board of Trade and Transportation and former minister to Turkey under President Cleveland. This committee has formulated a plan of action and is preparing a statement setting forth the present deplorable condition of the American merchant marine and the urgent need of its rehabilitation to former prestige on the high seas. It is

not the intention of the committee to advocate any plan or method by which the desired end may be gained, but rather to show the present state of affairs and seek for an expression of opinion as to a proper remedy to bring about a change that will be to the advantage of American shipping and thereby a direct benefit to the whole country. To this end it is the intention to send a copy of such statement to every newspaper, which should be interested in the subject, numbering some 22,000, and also to every agricultural society and commercial body in the United States, some 15,000 in number, with the hope that a statement of facts will arouse discussion and create an interest among the public in our ocean carrying trade that it has failed to receive heretofore; in fact, an interest commensurate with its importance as a factor in the upbuilding of our country.

It is the hope of the committee that by this means they will obtain a consensus of opinion from all classes and various business interests of the country on the question of aid to our merchant marine, and the best and most practical way of bringing about its restoration. As the work the committee has laid out will necessitate the expenditure of a considerable amount of money, besides their time, and the subject being one of general concern to the country, they have concluded to accept donations from those disposed to aid in the work, in sums not to exceed \$100 from any one person or firm.

#### LEADING THE WORLD IN EXPORTS.

The fact that the exports of the United States in the fiscal year just ended are greater than those in any preceding year except 1900 lends special interest to a statement presented by the department of commerce and labor, which shows the relative growth of the export trade of the principal countries of the world for a term of years and compares that of the United States with other countries. The table shows the total value of exports of domestic products from the principal countries of the world in 1870, 1880, 1890, and the latest available year. In the case of the United States the latest available year is the fiscal year ended June 30, 1903. In most other cases the latest available year is the year ended Dec. 31, 1902. In a very few cases the latest available year is 1901. In a few exceptional cases the figures presented are those of not only domestic products, but include foreign and colonial produce re-exported, but this is only true of a few of the smaller countries, which do not show their domestic exports separately from the total exports, and in these cases the share which foreign products re-exported forms of the total is so small as to not materially affect the statement.

The United States, which occupied fourth place in the list of exporting countries in 1870, now shows a larger total in the final column which represents the latest available year than does any other country of the world. The United Kingdom, France and Germany showed in 1870 a larger total of domestic exports than did the United States. By 1880 the domestic exports of the United States exceeded those of France or Germany, but were still below those of the United Kingdom. In 1890 the United States occupied a similar relation. In 1902, the latest available year for which the figures of the United Kingdom, Germany and France are available, the figures of domestic exports stood: United Kingdom, 1,379 millions; Germany, 1,113 millions; France, 818 millions; while those of the United States for the twelve months ended June 30, 1903, are 1,392 millions, stated in round terms, the precise figures as announced by the Bureau of Statistics being \$1,392,087,572.

The following table shows the domestic exports of the countries in question, stated in millions of dollars only, in 1870, 1880, 1890, and the latest available year:

	1870	1880	1890	1902
United States .....	377	824	845	a1392
United Kingdom .....	971	1085	1282	1379
Germany .....	b552	687	792	1113
France .....	541	669	724	818
Netherlands .....	154	251	435	c696
India .....	255	272	347	408
Austria-Hungary .....	192	275	309	388
Belgium .....	133	235	277	358
Russia .....	216	248	388	c369
Italy .....	146	213	173	284
Brazil .....	89	97	141	c197
Switzerland .....	...	d129	139	169
Argentina .....	29	56	97	173
Spain .....	77	125	181	142
China .....	87	106	111	135
Japan .....	15	25	49	127
Sweden .....	41	63	82	c95
Chile .....	27	52	51	c63
Norway .....	22	29	35	46
Mexico .....	e28	26	18	42

a, 1903; b, 1872; c, 1901; d, 1885; e, 1877.

The North German Lloyd steamship Kaiser Wilhelm II. has just completed an eastward run in 5 days, 15 hours and 55 minutes, lowering her best previous eastward record by 1 hour and 35 minutes.

The cruiser Galveston has been launched at the yard of the W. R. Trigg Co., Richmond, Va., and will be towed to the Norfolk navy yard to be finished.

### FLOATING DEPOSITING PONTOON DOCK.

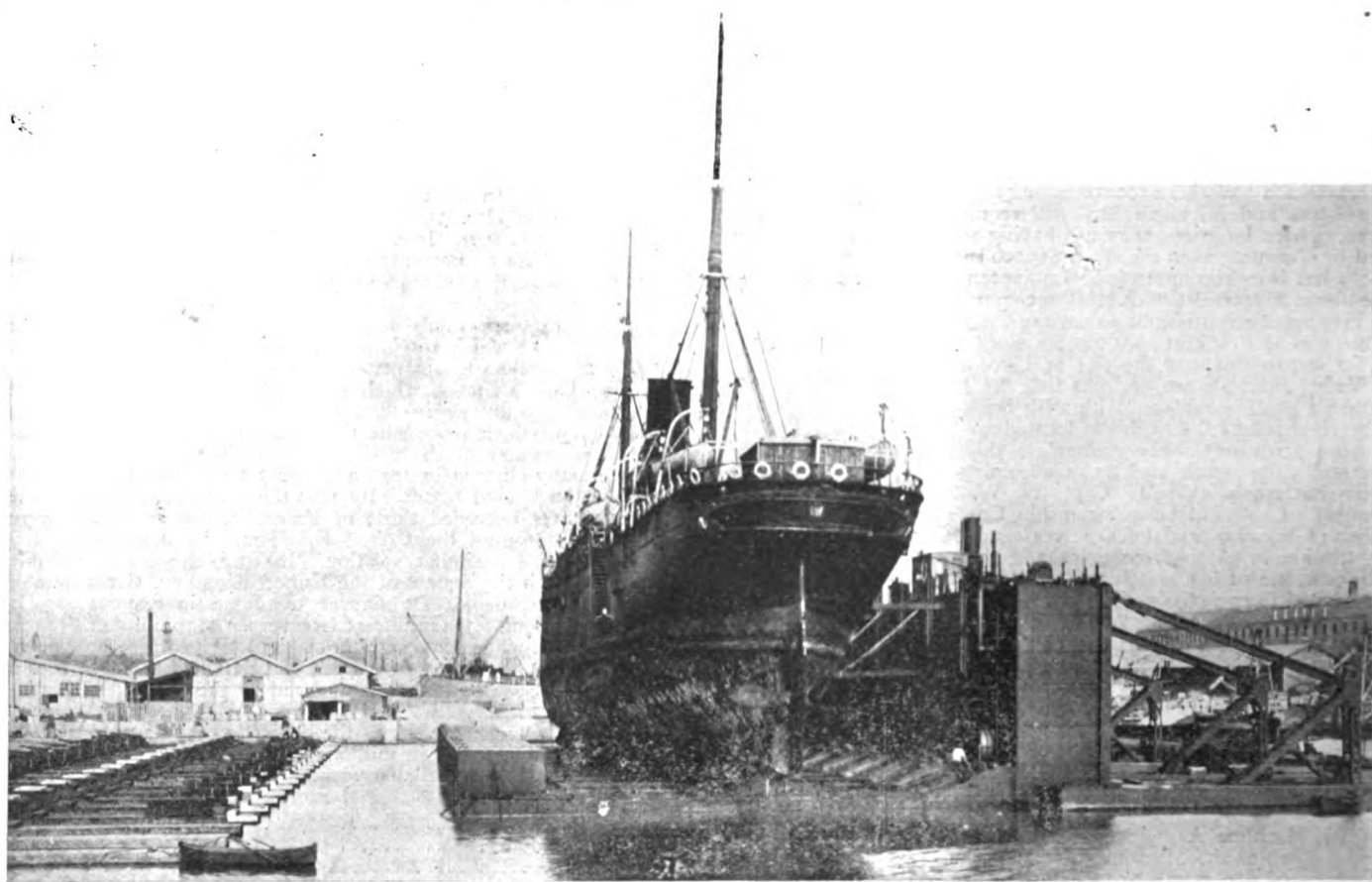
The English correspondent of the *Scientific American* contributes to his paper a description of the floating depositing pontoon dock that has recently been completed and handed over to the port authorities at Barcelona. This type of dock differs from the two-walled floating structures at Bermuda and Algiers, both in general design and in the functions it has to fulfill. The depositing dock is only adapted to those ports where there is ample vacant space, where business is not congested or pressing, and in non-tidal basins. At the same time it possesses several advantages over the graving dock, and if properly cared for is practically as durable.

For some years past some description of docking accommodation has been necessary at Barcelona, which is absolutely deficient in any such facilities; but it was not until 1894 that the port authorities took practical steps to provide adequate arrangements for drydocking large vessels. Several schemes for coping with the difficulty were projected but they were abandoned. Finally the problem was solved by the authorities deciding in favor of the depositing dock, invented by Messrs. Clark & Standfield of London, who make a specialty of this branch of marine engineering. Public competition was opened for the acquisition of one of the docks and a number of tenders were submitted. In the following year the result of the competition was announced and the tender of Messrs. Clark & Standfield, the inventors of the

when the dock is lowered into position at the gridiron the fingers of the dock slide between and fill up the spaces between the grids of the gridiron staging.

To the side of the vertical wall of the dock opposite to that to which the fingers are attached is a floating outrigger. This supplies the necessary stability to the structure, which, without these outriggers, would heel over, owing to its being one-sided; and furthermore, they serve to counterbalance the weight of a ship raised on the dock. The gridiron staging is erected along the foreshore. The grids are strongly constructed of iron, timber, and concrete. In this particular instance they are built on steel screw piles and are placed 7 ft. 10 in. apart. From the description it will be seen that this system of drydocking vessels possesses numerous advantages over the ordinary graving dock. The foreshore can be covered with the gridiron staging on both sides of the harbor, the additions being carried out with greater facility, expediency, and less cost than would be involved in the construction of a drydock.

The dock itself measures 366 ft. 11 in. from end to end and has a total lifting capacity of 6,000 tons. It is constructed in three sections each of about 122 ft. in length, and 2,000 tons lifting capacity. Only two of these sections, however, will be used in general practice, one being disconnected for the purpose of docking either portion for examination, repair, or renovation. As a matter of fact, it is one of the most salient characteristics of this type of dock with one vertical wall that it can with only the



Ship Raised on Pontoon, Ready for Transference to Gridiron to the Left.

[From the *Scientific American*.]

system, was accepted, working in conjunction with the firm of the Maquinista Terrestre et Maritime of Barcelona, since one of the conditions of the competition was that the dock must be built in Spain.

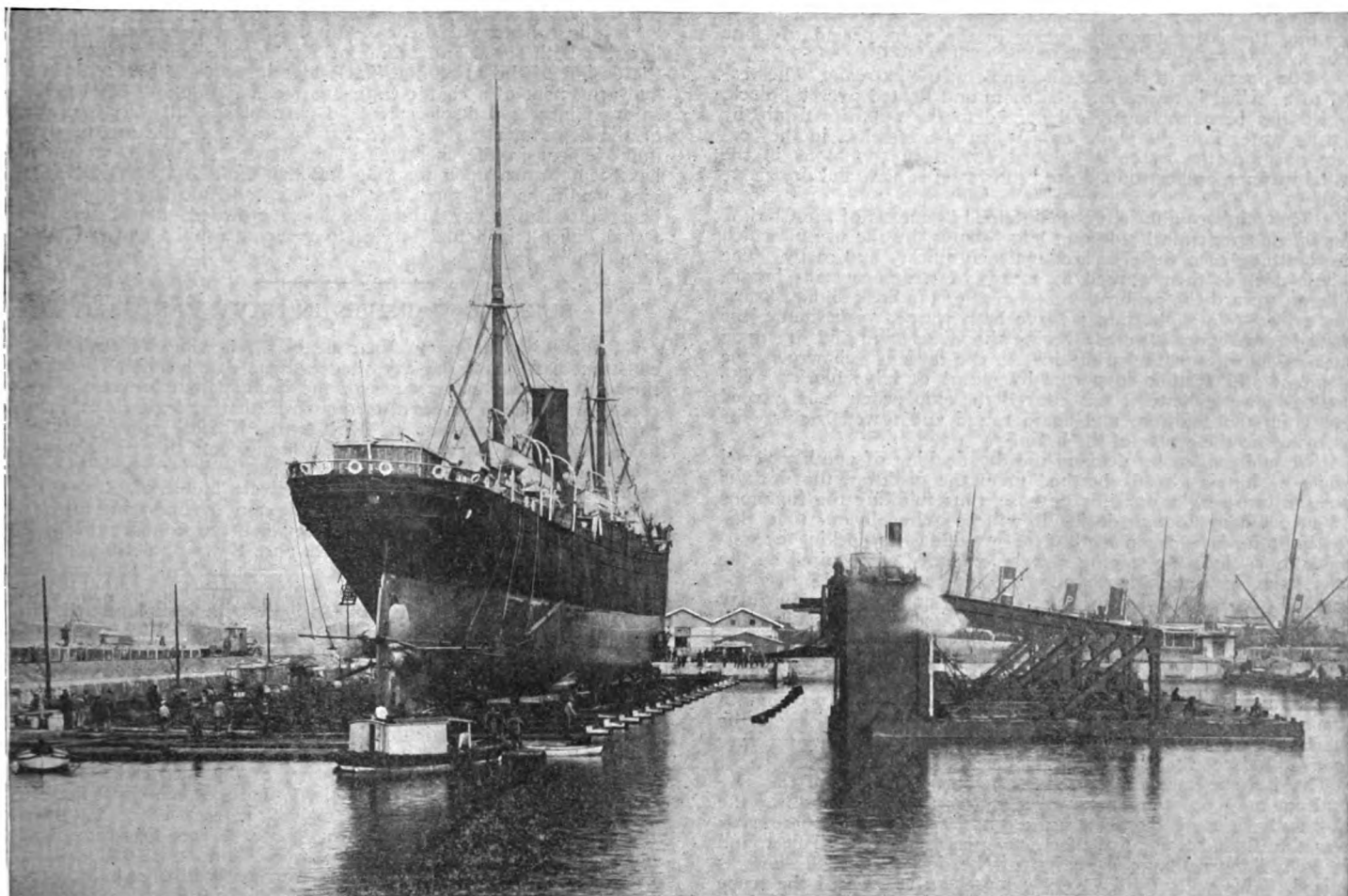
Although the depositing dock is not much in vogue (types of this system have been in operation with conspicuous success at the ship yard of Messrs. Vickers, Sons & Maxim, Barrow, England, and at Nicolaieff in Russia for several years past; but neither of these structures approaches the dimensions of the Barcelona dock. That at Barrow has a lifting capacity of only 3,200 tons. The port of Barcelona is splendidly adapted for the installation of a dock of this type.

The general principle of the design of the floating depositing dock is as follows: There is a wall or vertical side, as in the case of the two-walled type, and it is similarly constructed; but the pontoon of the structure, instead of consisting of a complete base of caissons, extending the whole length of the dock, is built up of a number of separate pontoons, attached only to the vertical wall at one end while the opposite ends are free, the detached pontoons thus projecting longitudinally from the vertical wall, somewhat in the same manner as the fingers of the hand, with equal spaces between. On the foreshore is built a solid structure called a gridiron, the grids of which correspond in length, width and spaces between to the fingers of the dock. The result is that

slightest preparation dock itself. The connection of two sections will give the dock a lifting capacity of 4,000 tons, and it will be capable of accommodating vessels up to 300 ft. in length. The third section, of 2,000 tons, it is intended to work by itself for dealing with smaller craft, such as coasting vessels, though it will always be in readiness to supplement the lifting capacity of the other and longer dock whenever required, and thus bring the dock up to its maximum lifting capacity of 6,000 tons. The dock when the three sections are bolted up can take a vessel up to 460 ft. in length. Hence it is adaptable to a very wide range of vessels, while the ingenious idea of detaching the third section and using it for smaller vessels enables the dock to be always employed. Each section is in reality a complete dock in itself, being equipped with all the necessary pumping and hauling gear. Another very interesting feature of the structure is that supposing vessels of greater length and tonnage than the dock is at present capable of lifting, even when complete, should frequent the port, a further section or sections can easily be added with but little expense.

The dock is situated in a kind of basin or outer harbor almost square in shape. The depositing grids, each 656 ft. in length, are ranged on either side of the basin. One grid is intended for the accommodation of vessels of 2,000 tons displacement, and the other up to 6,000 tons. The dock is moored in the center of the basin with the two sections as described placed back to back, and





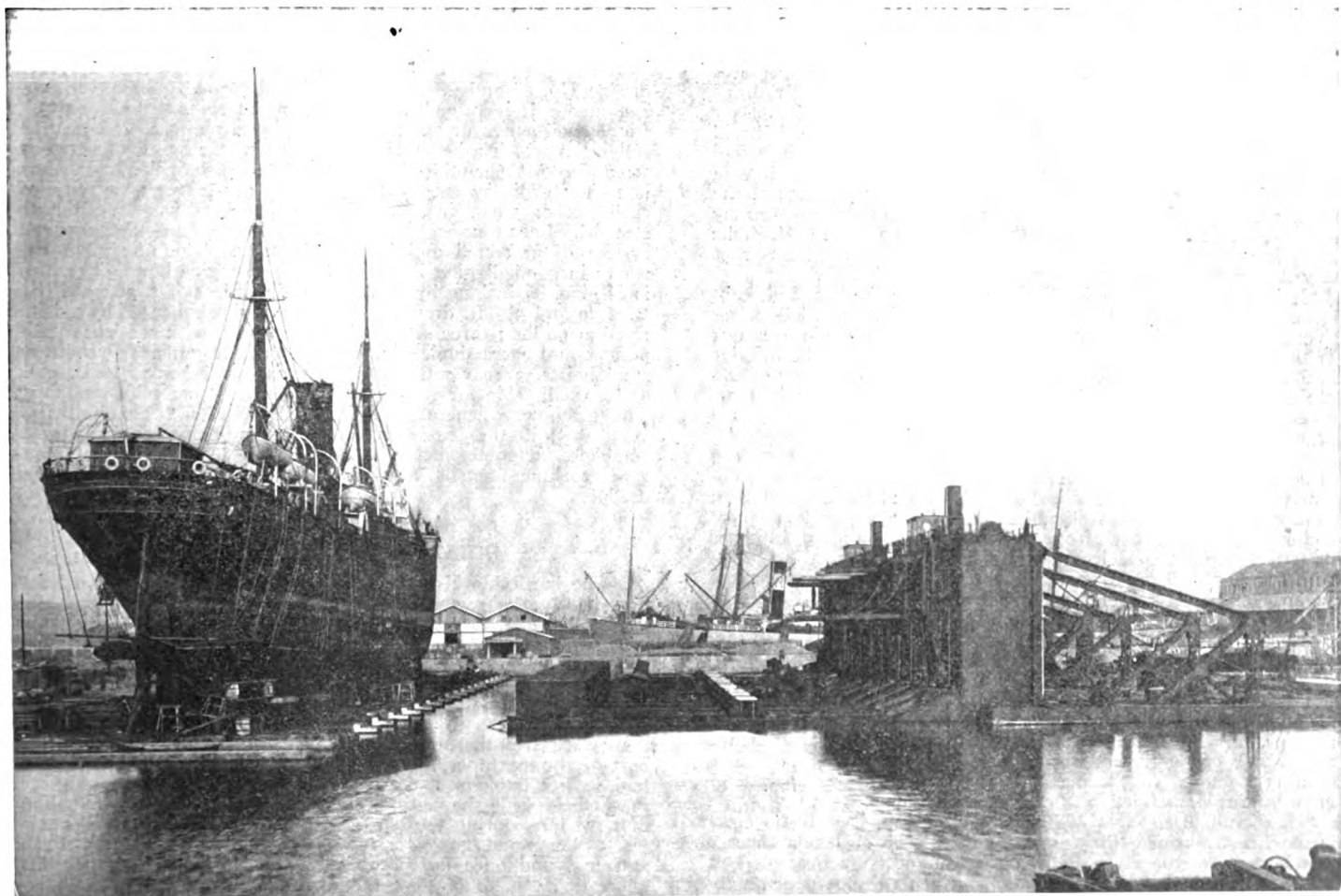
**Ship Docked on Gridiron, Pontoon Sunk and Drawing Clear.**

[From the Scientific American.]

with the pontoons facing the grid staging, the smaller section opposite the lighter grids, which will deal with vessels up to 2,000 tons, and the other dock facing the heavier staging.

The dock is provided with ample machinery for hauling, and

gear for traversing the different sections, either together or separately from their moorings to all parts of the depositing grids, the engine power being adequate for the performance of the several operations of lowering the dock, lifting the vessel, and de-



**Pontoon Raised, Ready for Another Ship.**

[From the Scientific American.]

positing the latter upon the grids in the short period of four hours.

The operation of the dock is simple in the extreme. The vessel to be lifted is towed into the basin and floated over the dock, which has been previously submerged to the requisite depth, by letting water into the pontoons. When the vessel is in the correct position, the water is pumped out of the pontoons in the usual manner, and continued until the vessel is high and dry above water.

The ship's equilibrium is maintained by means of the Clark & Standfield mechanical side and bilge shores, by the use of which the berthing of a vessel is accomplished quickly and easily. The whole dock is then warped by means of steam capstans broadside on toward the gridiron, the fingers of the dock sliding below the grids. When the fingers have been warped right home, the dock is once more lowered, leaving the vessel high and dry upon the keel blocks on the gridiron. As the dock is submerged, the vessel is still further supported by means of bilge blocks. The dock is lowered until it has cleared the ship, when it is warped out from the gridiron, and again raised and towed back to its moorings in the center of the basin.

Should exigencies demand the dry-docking of another vessel while a ship is already berthed upon the gridiron, the dock is pressed into service for this purpose, thus fulfilling the functions of an ordinary floating dock. It will be quite obvious that this system affords a cheap method of providing drydocking accommodations, since the staging may be extended as required by the necessities of the harbor, and two or three vessels may be berthed high and dry upon the gridirons, and another ship may be simultaneously docked upon the dock itself. The raising and docking of a vessel upon the gridiron can be carried out expeditiously, and three or four ships can be berthed in a single day.

The machinery fitted to this dock is sufficient to lift a vessel of the maximum displacement. The dock will raise 6,000 tons in one and a half hours, and in the official trials of the structure the machinery was found to have a considerable margin of power over and above that required.

The illustrations accompanying this article illustrate the several operations of the dock carried out in the official tests by the port authorities of Barcelona. The vessel employed for these trials was the Ciudad Condal of the Compania Transatlantica fleet, and is 40 ft. longer than the section of the dock by which she was raised. This will afford a very comprehensive idea of the scope of the work to be achieved by the dock. If properly attended to, and periodically examined, this depositing floating dock will last almost if not quite as long as a graving dock, while its serviceability is far wider in range.

### THE 13,000-TON BATTLESHIPS.

Secretary Moody has left Washington for a brief vacation without reaching anything conclusive in the controversy which has taken place over the design of the two 13,000-ton battleships Idaho and Mississippi. It is supposed that he took with him the reports of Rear Admirals Melville and Bradford against the plans of Rear Admirals Bowles and O'Neil, the other members of the board of construction. Admirals Melville and Bradford contend that the speed of 16 1-2 to 17 knots and the coal capacity of 1,750 tons provided for in the plans of Bowles and O'Neil will be insufficient and that in order that the Idaho and Mississippi may be effective units in the fleet formations they should have a speed of 18 knots and coal capacity of 2,000 tons. Copies of the reports of Melville and Bradford were made public on Saturday last. Admiral Bradford makes the main argument, in which he holds in effect that the Idaho and Mississippi have not been properly designed. He says:

"It is true that I have, in discussions before the board on construction, suggested a higher rate of speed for the Idaho class than that possessed by most battleships, for the following reason: With a displacement of 13,000 tons these ships must be inferior in fighting capacity to the latest type of battleship of 16,000 to 18,000 tons; therefore in order that a ship of this class might escape if attacked by a more powerful ship, superior speed was urged. I found, however, after an examination of the sketch designs submitted to the board by the chief constructor, that a speed of 20 knots required too great a sacrifice of the offensive and defensive qualities of these ships, and abandoned the idea. I then advocated that the ships should at least have a speed and coal endurance equal to that of our battleships now building, in order that they might be efficient units in fleet formation. The president of the board on construction quotes the act authorizing the Idaho class as a reason for the design submitted as follows: 'Two first-class battleships, carrying the heaviest armor and most powerful ordnance for vessels of their class, upon a trial displacement of not more than 13,000 tons, and to have the highest practicable speed and great radius of action.' The italics are his.

"If this act is considered with the italics differently placed, its meaning may be differently construed, viz.: 'Two first-class battleships, carrying the heaviest armor and most powerful ordnance for vessels of their class upon a trial displacement of not more than 13,000 tons, and to have the highest practicable speed and great radius of action.'

"Has it not been clearly shown that the proposed Idaho class is too heavily armed 'for vessels of their class'? Is not the act mandatory that the class shall have the highest practicable speed and great radius of action, functions which the board distinctly states have been sacrificed?"

Admiral Melville indorsed Admiral Bradford's statement as follows:

"I fully concur with Rear Admiral R. B. Bradford in the belief that both speed and radius of action have been sacrificed in the design of the 13,000-ton battleships in order to secure armor and armament of a character that is more appropriate for battleships of increased displacement. I particularly call the attention of the department to the fact that by reason of the progressive improvement in the character of the power an increased strain has been thrown upon the ship and that time and practical service conditions will show that too many and too large guns are being installed. The armament is so crowded that it will be found difficult in actual service to secure a rapid supply of ammunition."

### BUILDING WARSHIPS IN NAVY YARDS.

Apparently the navy department is renewing its efforts to construct battleships in navy yards. Rear Admiral O'Neil takes the view that the navy yards of the country will be greatly increased in value if given constant work, that at least three navy yards on the Atlantic coast—New York, Norfolk and Boston—have the facilities for turning out battleships, and that by inaugurating the policy of building its own ships the government will be able to command better terms from private builders. Rear Admiral Bowles, chief constructor of the navy, is preparing an exhaustive statement of comparisons between the Louisiana, which is being built at the yard of the Newport News Ship Building & Dry Dock Co., and the Connecticut, which is being built at the New York navy yard. It might be well before attempting to build any more battleships in navy yards to await the completion of the Connecticut and Louisiana. It will be a very surprising thing indeed if the Connecticut is more quickly or more cheaply built than the Louisiana. It is not readily to be perceived how she possibly can be. Private builders have to watch the element of cost more closely than the general government. Moreover the purpose of the navy yard is to repair the fleet. It is well that the government should have navy yards where vessels may put in for incidental repairs and not run the chance of finding a private yard occupied; but to utilize them for the building of ships complete is an encroachment upon legitimate private enterprise. It has been the history of ship building in the United States that there has not been much profit in government work. Therefore the position of Rear Admiral O'Neil that the government will be able to command better prices from the ship builders is not a tenable one.

### GOVERNMENT SELLING A DREDGE.

Capt. Chas. H. Bromwell, United States engineer at Vicksburg, Miss., will open proposals Aug. 21 for the purchase of a Bucyrus dredge which may be seen at Shreveport, La. The dredge was built by the Bucyrus Co. of South Milwaukee in 1892, for the New Orleans and Northeastern Railroad and was used for filling the Lake Pontchartrain trestle and building the Florida walk embankment near New Orleans. It was purchased and repaired by the United States in 1895. It is designated as "elevator dredge No. 2" and is a good machine for canal building or embankment. It is an endless-chain-bucket machine, having a steel-frame spoil conveyor 90 ft. long, carrying a number of steel tube rollers on which a heavy rubber belt runs at a speed of between 300 and 400 ft. per minute. The depth to which buckets can work is 12 ft.; ordinary speed of buckets 45 per minute; capacity of each bucket 5 cu. ft. The chain of buckets has an ultimate strength of 220 tons and is constructed upon Robinson's improved system of protected and lubricated joints. The maximum capacity in good digging is 500 cu. yds. per engine hour. The hull is of pine, 86 ft. long by 40 ft. amidship and 14½ ft. at ends, 6½ ft. deep and 3½ ft. draught. It has a marine boiler 7½ by 7½ ft., rated at 90 lbs.; three sets of double engines, with condenser and pumps, and extra duplex bilge, deck and fire pumps; two steam spud hoists, a rear walking spud, tanks, coal bunks, tools, etc., and a small cabin for quarters. The dredge is not self-propelling. The machinery generally is in good condition. The hull and wood work need extensive repairs. The equipment which is quite complete, including anchors, anvils, forge, blocks, various tools, rope, cooking utensils, bedding, etc., etc., will be sold with the dredge.

### KEARSARGE'S QUICK RUN.

The battleship Kearsarge has just made another record for herself. In the run from Portsmouth to Frenchman's Bay she has beaten her eastward run across the ocean. She made the westward run, a distance of about 2,900 miles, in 9 days, 4 hours and 15 minutes, doing it at an average speed of 13.12 knots. Her former record was 12.62 knots for a distance of 3,200 miles. In the past fifty-three days the Kearsarge has run 8,200 miles and of this she has been in port twenty-four days. During the entire homeward trip there has not been a single breakdown in any part of the machinery. When she started from Portsmouth she had in her bunkers 1,508 tons of Welsh coal, and when she reached this side she had only 410 tons, giving her a consumption of 1,178 tons during the trip. Her highest speed during the trip was 15 knots and her lowest 10 knots. She was delayed by storm and fog, and once by an iceberg. The object in making this quick trip was to observe the working of the boilers and machinery to obtain certain data desired by Rear Admiral Melville, engineer-in-chief of the navy. The Kearsarge was built by the Newport News Ship Building & Dry Dock Co.



### FAIRBURN'S WATER-TUBE BOILER PAPER.

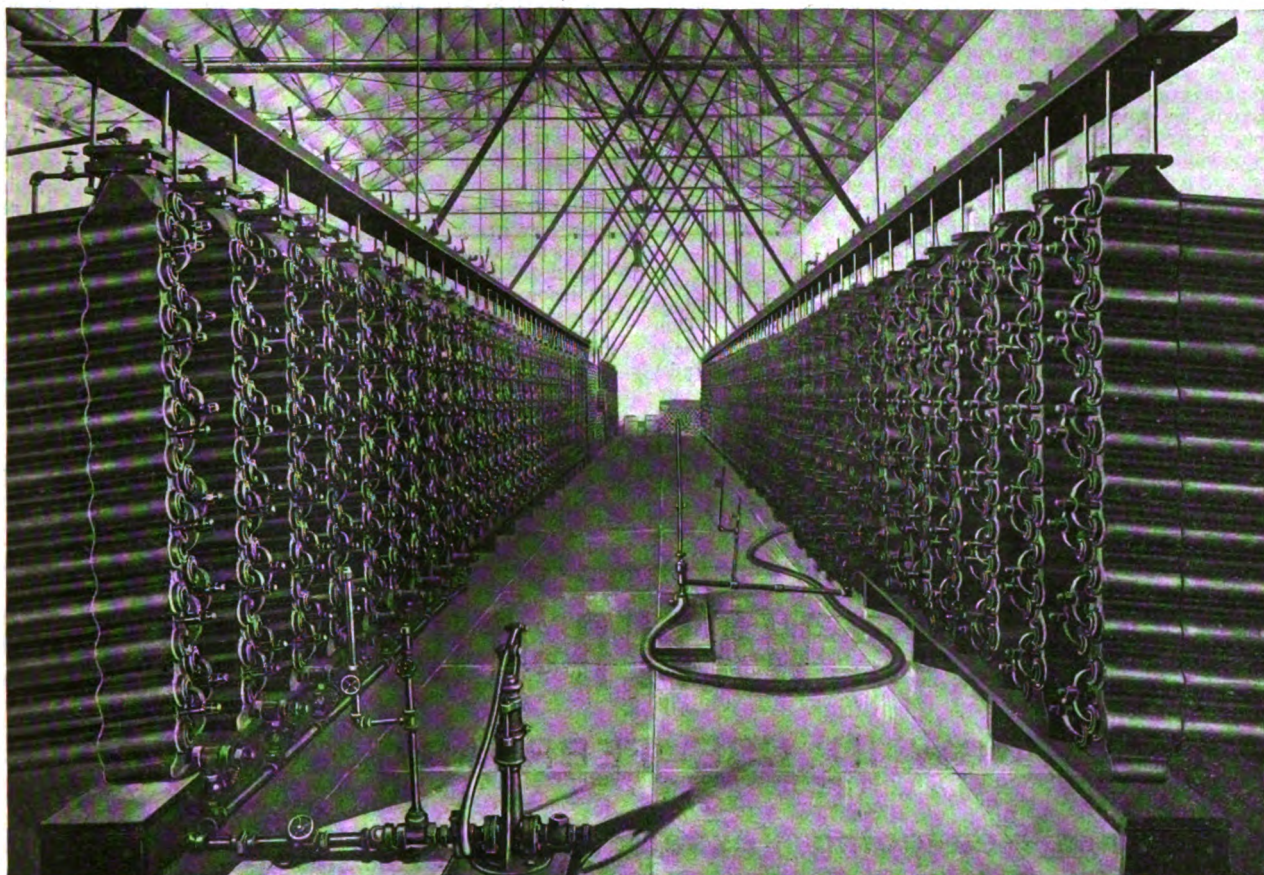
The Stirling Co., Pullman building, Chicago, manufacturers of the Niclausse water-tube boiler, have issued as a pamphlet Mr. W. A. Fairburn's exhaustive paper entitled "The Water-Tube Boiler in the American Merchant Marine," which was read in November last at the annual meeting of the Society of Naval Architects and Marine Engineers in New York. Mr. Fairburn was then connected with the Eastern Ship Building Co.'s works, New London, Conn., where the big Hill Pacific liners are building and which are to have Niclausse boilers. The paper was printed at length in the Review's impression of Nov. 27, so that extended reference to it now would be superfluous. Mr. Fairburn went very thoroughly into his subject and was admitted to have added considerably to the literature on the subject of the water-tube boiler. Mr. Fairburn in his paper said that the design of the Niclausse boiler is based on sound and rational principles and that it presents exceptional facilities for opening up and cleaning. Describing the boiler he said:

"The standard marine boiler consists of  $3\frac{1}{4}$ -in. generating tubes, set at an angle of 6 from the horizontal. The inner circulating tubes are 1 19-32 in. diameter. A small tube boiler with generating tubes 1 9-16 in. diameter is also built. The height of a standard large tube mercantile marine Niclausse boiler to the

boilers can be arranged in both side and end battery form; well adapted for air supply over fires; has absolute freedom from expansion; ease and rapidity with which tubes can be swept by use of steam jet from front of boiler, if this method of cleaning is desired.

Mr. Fairburn points out the following as possible criticism on design and construction: Inability to thoroughly drain the boiler, except by special appliances, such as syphoning or emptying each tube separately; abrupt turn of water at the rear end of tubes when circulating from the inside to the outside which would seem to impede the circulation; necessity of removing the circulating tube for the purpose of cleaning the inside of the generating tube, also more cylindrical surfaces to clean makes task more arduous; malleable-iron or semi-steel headers and castings under pressure not considered good engineering practice, but the Stirling company is to build boilers with wrought-steel headers, which will eliminate this criticism; continued tightness of cone joints under actual service conditions, against which engineers are usually prejudiced, but these cone joints very probably give satisfactory results; screwed joints exposed to hot gases and pressure; a machine shop rather than a boiler shop production; large list of spares required.

It will be recalled by those who attended the meeting of Naval Architects and Marine Engineers that Mr. Fairburn's paper was vigorously discussed and that chief among those participating



Elements on Testing Blocks, Niclausse Boilers for Great Northern Steamships Minnesota and Dakota.

top of a 16-in. steam dome is 17 ft. 4 in., but the height of combustion chamber, 3 ft. 3 in., height of grate above foundations, 2 ft. 5 in., diameter of steam drum, 3 ft. 9 in., and height of steam dome could all be slightly reduced if necessary. The width of the boiler can be determined by the number of elements multiplied by  $7\frac{1}{4}$  in. plus 20 in. Any number of elements can be incorporated into one casing up to about 22. The tubes are usually 7 ft. 3 in. long, and there are twenty-four tubes in one element, the heating surface of each element being 146 sq. ft. The tubes can be shortened if desired. The length of the boiler casing can be obtained by taking the lengths of the tube and adding 16 in. The height of the rectangular casing is 6.1 ft. plus height of combustion chamber, plus height of grate above foundation, usually 11 ft. 9 in. This boiler has not been used very much for merchant work, but the two large vessels now being built by the Eastern Ship Building Co. for the Great Northern Steamship Co. are being fitted with Niclausse boilers. The Niclausse boiler has been much criticised on account of its malleable-iron headers and cone joints. The Stirling company are now building wrought steel headers, but as the connection between the tubes and the headers possesses great merit, and is undoubtedly the feature of the boiler, the prejudice existing concerning these joints must be overcome, for in the most severe service no trouble has been experienced."

Mr. Fairburn sums up the special advantages of the Niclausse boiler as follows: All joints are at the front and the boiler can be thoroughly cleaned, examined, and repaired from the front; no cutting away is required to replace a tube, none are expanded;

was Mr. A. H. Raynal, chief draughtsman of the bureau of steam engineering, navy department. Mr. Fairburn was not present to reply to Mr. Raynal, but took advantage of the rules of the society which permitted him to reply in writing later. His reply to Mr. Raynal is now incorporated in the pamphlet.

The C. O. Bartlett & Snow Co. of Cleveland have erected at their works two of their dryers—one the Triumph steam dryer and the other the Direct Heat rotary dryer. So convinced is this company of the advantages to be derived in cleanliness and economy from the drying and pulverizing of coal that it announces that it will be glad to make any test runs, dry any kind of material, either by steam or direct heat for intended purchasers under the following conditions: All material to be shipped, charges prepaid; where possible send along a competent man to take charge of the results such as cost, time required, amount of moisture taken out, etc. The company will make no charge for use of dryer or power, but will charge only the actual cost required for handling the material to be dried. The company suggests that 500 lbs. or a car-load be sent to be dried.

Rear Admiral R. B. Bradford, chief of the navy bureau of equipment, who applied some time ago for sea duty, is to be assigned to command the battleship Illinois. In taking this command Admiral Bradford will relinquish his present rank, which he holds by virtue of his office as a bureau chief, and will return to the rank of captain, his regular grade on the naval list.



**UNITED STATES SHIP BUILDING CO.'S AFFAIRS.**

The following official statement regarding the United States Ship Building Co. reorganization was issued in Wall street on Monday:

William Nelson Cromwell, of counsel for the reorganization committee, announces that two-thirds of the entire outstanding issue of first mortgage bonds have been deposited with the committee and over \$1,000,000 additional bonds also placed under its control. This insures the success of the committee's plans. At the instance of the committee and for the purpose of carrying out the plan, foreclosure suits have been instituted in the various districts, and they will be pushed to decree of sale at the earliest practicable date. The purpose and policy of the committee are to maintain the unity of the Bethlehem Steel and Ship Building interests unbroken for the benefit of all concerned, either as bondholders, stockholders or creditors. The time for deposit with the committee expired yesterday, and no further deposits will be solicited by the committee.

Samuel Untermyer, counsel for the bondholders' protective committee and for the receiver, declined to comment on this statement further than to say:

"If Mr. Cromwell's repeated assurances for the last three months at intervals of about one week to the effect that the success of the plan was assured would assure its success, the plan ought long since to have succeeded. The bondholders' time to deposit bonds under the plan of the Sheldon committee expired on June 15, since which the time has been repeatedly extended under threats that no more bonds would be taken, but, somehow or other, the committee always relents at the last moment. I notice the concluding paragraph of Mr. Cromwell's statement that 'no further deposits will be solicited.' I have no doubt the word 'solicited' has been advisedly used. Mr. Cromwell is too good a lawyer not to know that his plan is long since dead and buried, and can only be revived if the dissenting bondholders withdraw their opposition."

**NAVAL MANEUVERS.**

An elaborate program for the maneuvers of the combined North Atlantic fleet off the coast of New England and Long Island Sound has been prepared at the navy department. The general features for the movement of the ships will be worked out by the department, leaving to Admiral Barker, the commanding officer, the numerous details incident to the maneuvers. From Aug. 3 to 10 the search problem will be developed between Eastport and Cape Ann. This will include an effort on the part of a presumably hostile squadron to enter an anchorage ground in the face of the defending fleet. Following this there will be a cessation of two days, during which the combined fleet will proceed to Long Island sound and anchor abreast of Oyster Bay on the night

of Saturday, Aug. 15. They will remain there during Sunday, and on Monday they will be reviewed and inspected by President Roosevelt.

From about Aug. 22 to 29 there will be joint demonstrations by the combined fleet against the batteries at Portland, Me. These will continue day and night, and all the arts of mimic warfare will be resorted to by the men-of-war to gain safe entrance into the harbor. Umpires will decide on the merits of the contest. When the summer maneuvers are concluded the ships will go south and begin a season of target practice at Gay Head, in the vicinity of Martha's Vineyard. This will consume the first week in September, and at its conclusion the ships will disperse to the various navy yards for repairs preparatory to their winter cruise in the West Indies. More than thirty vessels are expected to participate in the maneuvers.

The bureau of navigation of the navy department is making arrangements for separate maneuvers of submarine boats, probably after the regular maneuvers off the Maine coast next month. The government work with submarines up to this time has been confined to the training of crews to navigate them under water and to discharge torpedoes. Lieut. Pinney, who has been maneuvering the *Adder* and *Moccasin* at Newport, recently ran the *Adder* submerged at a depth of 30 ft. for half an hour and then, rising to about 8 ft. below the surface, made a good line shot at a target at a distance of from 500 to 700 ft. The same day he took out the *Moccasin*, and from a distance of 15 ft. below the surface of the water sent a Whitehead torpedo through a target 1,200 ft. away. His work has been commended by the department.

Herbert M. Gibson, superintendent of traffic of the ship canal at Manchester, England, is in this country to look into the ways and means of promoting interest in Manchester as a shipping point. The growth of Manchester's transatlantic commerce he reports to be very gratifying. In 1902 it amounted to about 3,000,000 gross tons and from present indications, it will total during 1903 not less than 3,000,000 tons. This, during a period of light freights, Mr. Gibson regards as a very satisfactory showing. One of the successful ventures that has helped to increase the total of Manchester's commerce is the new Manchester-Boston service of the Leyland Line of the International Mercantile Marine Co. This was established in January, 1903, and has proved to be one of the most successful lines out of Boston.

Capt. J. Lowes and his entire crew of the steamer *P. P. Pratt* were transferred from that boat Monday going from Ashtabula to Cleveland to man the steamer *W. H. Mack*. Capt. H. Burns succeeds to the command of the *Pratt*.

# BELLEVILLE WATER-TUBE BOILERS

**NOW IN USE (FEBRUARY, 1903)****On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.**

French Navy	-	-	-	-	-	-	-	276,460	H. P.
English Royal Navy	-	-	-	-	-	-	-	849,300	"
Russian Imperial Navy	-	-	-	-	-	-	-	193,900	"
Japanese Imperial Navy	-	-	-	-	-	-	-	122,700	"
Austrian Imperial Navy	-	-	-	-	-	-	-	32,900	"
Italian Royal Navy	-	-	-	-	-	-	-	13,500	"
Chilian Navy	-	-	-	-	-	-	-	26,500	"
Argentine Navy	-	-	-	-	-	-	-	13,000	"
The "Messageries Maritimes" Company	-	-	-	-	-	-	-	87,600	"
Chemins de fer de l'Ouest: (The French Western Railway Co.)	-	-	-	-	-	-	-		
plying between Dieppe and Newhaven	-	-	-	-	-	-	-	18,500	"
<b>Total Horse Power of Boilers in Use</b>	-	-	-	-	-	-	-	<b>1,634,360</b>	

**WORKS: Ateliers et Chantiers de l'Ermitage, at Saint-Denis (Seine), France.****TELEGRAPHIC ADDRESS: Belleville, Saint-Denis-Sur-Seine.**

## ITEMS OF GENERAL INTEREST.

At the yard of the Townsend & Downey Ship Building & Repair Co., Shooter's Island, N. Y., the three-masted schooner yacht Atlantic was launched on Monday of this week. She is being built for William Marshall of New York and is 189 ft. over all, 138 ft. on the water line, 30 ft. beam and 21 ft. deep. Miss Helene Demarest christened the yacht. A rather unfortunate accident marked the launching. As the yacht got about half way down the ways the launching hawser parted and she struck the water with terrific force. She continued straight across the sound and ran into a barge belonging to the New York Central Lighterage Co. The taffrail was carried away and about a dozen of the stern plates were bent.

While swinging into her berth at the Norfolk navy yard this week the United States monitor Arkansas, which was recently up the Mississippi river and had just arrived for extensive repairs, smashed into the stern of the receiving ship Richmond, damaging that vessel considerably and carrying away the davits and other fittings of the monitor.

Prime Minister Seddon of New Zealand has introduced a bill in the legislative assembly empowering the government to prohibit or restrain coastwise trading in New Zealand by ships of foreign countries. The purpose of the bill is to counteract the disadvantages to which British ships may be subjected by vessels of other countries.

Capt. Benjamin P. Lamberton has been selected to command the South Atlantic station and will hoist his flag on the Newark early in September.

Groundings have been frequent on the great lakes of late. The steamer Panther, upbound without cargo, struck the rocks of Gravel bay at the east end of Drummond's island about 6 miles below Detour during a fog on Wednesday. The steamer ran out her full length and is in an exposed condition. The wrecker Favorite went to her assistance. The steamer Spokane, going up with coal, struck an obstruction on Wednesday also near Colchester and anchored off Boise Blanc light with her forward compartments full of water. The tug Peerless went to her assistance. Enough of her cargo will be lightered so that she can be taken to Detroit and patched.

Sunday party rates via Nickel Plate road.—Persons desiring to avail themselves of the very low rate afforded for parties of five or more traveling on same train from any station on the Nickel Plate road to any other station on that road within 100 miles from starting point and return same day, are hereby notified that they are required to procure such tickets before the arrival at starting point of the train on which they desire to travel. Agents are not permitted to sell these excursion tickets within five minutes of the time advertised for the departure of the train for which they are sold.

114, July 24.

## The Blue Book of American Shipping

is a marine directory and is the only one published in the United States.

It contains a correct list of names and addresses of ship builders, engine and boiler builders, vessel owners, steamship lines, repair yards, dry docks, dredging companies, marine engineers, captains of vessels and all persons identified with shipping and its allied trades.

If you are a manufacturer or dealer in products consumed by any of these, the Blue Book is the very book you want.

It will be to your advantage to subscribe to the Blue Book in advance of its publication for this reason: A classified directory of marine manufactures and supplies is compiled from among its advertisers and subscribers and this list is consulted constantly by ship builders and ship owners. Your name will be entered under suitable headings according to your products.

It is the biggest Five Dollars worth of advertising to be had anywhere.

The 1903 edition of the Blue Book is now in course of preparation, therefore promptitude is a necessity if you desire your name to be inserted in the classified directory.

The price of the Blue Book is \$5.00 and it is delivered free of carriage.

MARINE REVIEW PUBLISHING CO.,  
39-41 Wade Building,  
Cleveland, Ohio.



## WORLD'S MERCANTILE MARINE.

Advance sheets of the statistical tables prepared for the new edition of Lloyd's register contain valuable details of the actual position of the mercantile marine of the United Kingdom and of all the other maritime powers of the world, indicating the changes that have taken place during the past year and showing the number, tonnage and description of the vessels that have been added to or removed from the registers in the course of twelve months. It may be noted of the figures referred to that they are based on the net tonnage of sailing vessels and the gross tonnage of steamers. At the present moment the shipping of the world consists of 29,943 steamships and sailing vessels, representing a tonnage of 33,643,131 tons. This fleet is divided as follows:

	Number.	Tonnage.
Steamers .....	17,761	27,183,365
Sailing vessels .....	12,182	6,459,766
Total .....	29,943	33,643,131

These figures show an increase over last year of 315 vessels and of 204,368 tons. The advance, however, is entirely in steamships. Not only were there fewer sailing vessels built in 1902 than in any previous period in the history of the industry, but a large decrease took place in the number and tonnage of those on the registers of the various countries—290 vessels and 118,000 tons. Of the total tonnage of 33,643,131, nearly one-half of it is owned in the United Kingdom and colonies. A year ago that country had in its possession nearly 15,500,000 of shipping tonnage, but now its tonnage for the first time exceeds 16,000,000. Upwards of 14,000,000 of the tonnage is composed of steamships, leaving less than 2,000,000 in sailing ships. The rest of the nations combined have more than twice as much sailing tonnage, but, on the other hand, their steam tonnage falls short of that of the United Kingdom by more than 1,000,000.

The following are details applicable to each country possessing over or close upon 100,000 tons of shipping, in the order of precedence:

Flag.	Tonnage.	Flag.	Tonnage.
British .....	16,006,374	Dutch .....	658,845
*American .....	3,611,953	Danish .....	581,247
German .....	3,283,247	Austro-Hungarian ..	578,697
Norwegian .....	1,653,740	Greek .....	378,199
French .....	1,622,010	Belgian .....	157,047
Italian .....	1,180,335	Brazilian .....	155,086
Russian .....	809,648	Turkish .....	154,494
Spanish .....	764,447	Chilian .....	103,758
Japanese .....	726,818	Portuguese .....	101,304
Swedish .....	721,116	Argentine .....	95,780

The Chinese, who come next, have only 60,000 tons, and the other smaller powers are much below such figures. So far as this table is concerned, it shows that all the countries named have increased their shipping tonnage during the last year. The size of steamers belonging to the various nations of the world is another subject of comparison. Not so many years ago the number of great merchant leviathans—that is, vessels of 10,000 tons or over—could be shown by the fingers of one hand. Recently, however, these huge steamers have multiplied to a very large extent. Twelve months ago they came to seventy-one and now amount to eighty-seven. Fully the half of them are registered in the United Kingdom, but Germany has upwards of twenty. Taking these leviathans in conjunction with all other boats of 5,000 tons and upwards, the following table is obtained:

	Over 5,000 Tons.	Over 7,000 Tons.	Over 10,000 Tons.
British .....	336	119	48
German .....	59	15	26
American .....	34	7	7
French .....	30	4	2
Dutch .....	6	1	4
Russian .....	10	2	—
Austro-Hungarian .....	4	1	—
Japanese .....	16	—	—
Spanish .....	7	—	—
Danish .....	—	1	2

While, therefore, the British steamers of 5,000 tons and over number considerably more than 400, the German steamships are

scarcely one-fourth so many. The United States has less than fifty, and so on. As regards speed, the palm must still be awarded to the Germans, but that position may be reversed as soon as the new Cunarders make their appearance on the ocean.

## LARGEST BATTLESHIP IN THE WORLD.

A new British battleship, King Edward VII, largest in the world, was successfully launched by the Princess of Wales at Devonport on Thursday last. The vessel will cost \$7,500,000. She is of 16,350 tons displacement. This is 350 tons more than the Louisiana now building at Newport News and the Connecticut now building in New York. The King Edward VII is 425 ft. long, has 78 ft. beam, a draught of 26 $\frac{3}{4}$  ft., and has 18,000 H. P. Her armor belt is from 8 in. to 12 $\frac{1}{2}$  in. in thickness and of Krupp steel. Her armament consists of four 12-in. guns, four 9.2-in. guns, ten 6-in. guns and twenty-four guns of smaller caliber. She has two torpedo tubes. Her estimated speed is 12.5 knots. She carries 950 tons of coal and has a complement of 800 men.

## REPRESENTATIVE BURTON IN BERLIN.

Representative T. E. Burton of Cleveland, chairman of the house committee on rivers and harbors, commenting on his European trip to Berlin this week said that there is always danger in forming hasty impressions from investigations in Europe made with a view to the application of foreign methods in America. It was hard to form general inferences about the relative merits of land and water transportation when it was remembered that in Germany the maximum load carried by a freight car was 15 tons, as against 50 tons and more in the United States. Mr. Burton added that rivers like the Elbe and Rhine, which carried enormous traffic, did not, like many rivers in the United States, require the construction of locks and dams to correct differences of level or to accumulate sufficient water for navigation. In France, however, some of the rivers had an average of almost one lock a mile over considerable stretches.

Mr. Burton said the subject of the sharing of expense of construction by localities in the matter of river and harbor improvements had received his attention. In this respect there was great diversity in Europe. In France the central government paid all the expenses, and until recently no request for contributions from cities or localities immediately benefited had been made. In Germany, on the other hand, the imperial government paid nothing. The respective states, such as Prussia, Bavaria, and Saxony, improved the channels of streams in or adjacent to their territory, while the harbors were improved at the expense of the ports. Hamburg had contributed great sums, while Mannheim, on the Rhine, had spent millions of dollars on the improvement of its river harbor.

Acting on information furnished to him from many sources that steamers carrying crowds of excursionists are frequently overcrowded to the danger point, Secretary Cortelyou has issued a special edict to the steamboat inspection service for a rigid enforcement of the regulations. Especially is this order to be observed at the forthcoming international yacht races. Supervising Inspector-General Uhler has accordingly issued a circular to inspectors and customs officers instructing them to double their vigilance in this direction and the passengers of excursion boats will be counted and compared with the authorized capacities of the boats. Where violations are found immediate steps will be taken against the owners of the vessels in question. The practice of issuing special permits for the carrying of additional passengers on particular occasions has been criticised. Such permits will not be issued in future unless the inspector is thoroughly satisfied that the requirements of additional lifeboats and lifebelts have been fully complied with.

## Towing Machine for Sale.

For Sale—One Shaw & Speigle towing machine, latest type; size of cylinders 12x12. Hawser 5 $\frac{1}{4}$  in. Placed on board ship but never used. Cost one year ago \$2,500. Address for further particulars and price, James Reilly Repair & Supply Co., 229 and 230 West street, New York City. Aug 6



**NEW METAL CARGO HOISTERS**

Wrought Iron Hook and Strap, Galvanized Iron Shells and Sheaves. Sheaves fitted with Genuine Star Metaline Bushings with Metaline Side Bearings.

**Star Metaline Bushing.**

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Chester, Pa.

NEW BOWDITCH'S PRACTICAL NAVIGATOR.

The new edition of Bowditch, just issued by the United States hydrographic office under the direction of Lieut. G. W. Logan, United States navy, is a work that ought to meet with great favor on the lakes. The chapters on compass, charts, compass error and piloting are explained in a manner that the average man should have little difficulty in comprehending. The chapters on sailings, dead reckoning, nautical astronomy, and instruments used, as well as the various methods used to determine the position of a ship at sea, have all been rewritten for this edition. The subject matter is now presented in a much clearer way than in the old edition, and this volume should prove of great service to those who have not a mathematical education, which was necessary to enable the student to fully understand the matter as it was presented in the previous editions of this work.

The publication extracts from the nautical almanac, giving data for the various sample problems in the work, was an excellent idea, as one can easily follow the explanation now, where before it was rather an up-hill job, and in nine cases out of ten the reader would consign the work to Davy Jones' locker, and have none of it. This is also true as to explanation of sailings, where the problem is worked out by use of the tables, and also alongside of it by the formulae. The various forms shown for the different problems should be a ready assistance to those who study it. There is an excellent chapter on the summer line, one on the winds, one on tides and one on ocean currents. The chapter on rules and principles of mathematics is clear and to the point.

The new work is divided into two parts. In the first part are 162 pages of text and 170 pages of appendices. Part II. contains the various tables, and the Traverse Tables have been extended to a distance of 600 miles, with the addition of a number of new and useful tables not contained in the old edition.

The book is bound in sheep, printed from new type on fine-sized and super-calendered paper, and bears evidence of great care in the preparation of the 650 pages. It can be obtained from the Marine Review. The price is \$2.25.

TRADE NOTES.

John F. Allen, 370-372 Gerard avenue, New York City, reports the following shipments of Allen riveting machines for the month of June: Westinghouse Electric & Mfg. Co., Pittsburg, two machines; Jones & Laughlins, Pittsburg, two; Decatur Bridge Co., Decatur, Ill., one; Baird Machinery Co., Pittsburg, two; Manning, Maxwell & Moore, New York City, two; New Jersey Bridge Co., Perth Amboy, N. J., one; Wellman-Seaver-Morgan Co., Cleveland, one; Chas. F. Ernst, Buffalo, one; Skobis Bros., Milwaukee, one; Canadian Bridge Co., Walkersville, Ont., one; total fourteen machines. Shipments are of complete machines only and point to a constantly increasing demand for these standard riveters.

Vessels classed and rated recently by the American Bureau of Shipping, New York, in the Record of American & Foreign Shipping are: American screw steamers Maine, Kiowa and City of Sydney; American side-wheeler Whitney; American schooners Geo. W. Truitt, John B. Biemiller and Dorothy Palmer; American terns Harry Knowlton, John C. Gregory and Wm. L. Elkins; American barkentines Addie Morrill and Rose Innes; American barks, Boylston and Chas. B. Kenney; American barges Hattie and Liberty; British schooner Basil M. Geldert; British terns L. A. Whidden, Silver Leaf, Catherine, and E. A. Post; British half brig James Daly; British barkentine Gaspe; Mexican screw steamer Tampico; Swedish tern Gunilla, Swedish schooner Hilda; Swedish brig Ida.

Mr. W. O. Duntley, vice-president and general manager of the Chicago Pneumatic Tool Co., left Chicago Saturday on a trip to the Pacific coast in the interest of his company. His trip will in all probability extend over a period of several weeks, as he will endeavor to call on as many as possible of the patrons of the company on the coast.

He states that business in the pneumatic tool line is in a flourishing condition, and that while the usual depression incident to this season is, of course, somewhat noticeable in the pneumatic tool line, still the various plants of his company are yet working

increased forces in order to take care of the business already on hand. Mr. Henry Engels, located at No. 91 Fremont street, San Francisco, who represents the company on the Pacific coast, has lately secured a number of large orders for pneumatic equipment for western concerns, including several of the Franklin air compressors manufactured by the Chicago Pneumatic Tool Co.

Lewis & Crane of Seattle, Wash., who make a specialty of spars and ship timber, are well known to the ship builders of the country. In an illustrated article dealing with the business of this firm, the American Lumberman says: "When a concern makes a specialty of a thing for ten or a dozen years it gets to be pretty nearly an expert in that line, and that is the case of Lewis & Crane, Seattle, Wash., as far as fir lumber, big and long fir timbers and spars are concerned. Because of push and energy and the fact that when they take an order they deliver the goods, Lewis & Crane are known among railroad and car construction men, ship and dock builders and the buyers of fir lumber and timbers from Maine to California, and along the Canadian Atlantic coast, where there is considerable ship building. They recently shipped a triple car load of fir spars from Grays Harbor in Washington to the Portsmouth navy yard, Norfolk, Va. It consisted of three spars 95 ft. long, 20 in. at the top and 24 in. at the butt, and five sticks 100 ft. long, 20 in. at the top and 26 in. at the butt. They are now getting out an order of eight spars 118 ft. long, 30 in. at the butt and 27 in. at the top, and two spars of the same length, 32 in. at the butt and 29 in. at the top. These will go into the same section of the country. Lewis & Crane, from their extensive acquaintance with the buyers and users of long and heavy stuff in fir, and their close connection with the mills in Washington and Oregon, are prepared to get out this class of material on short notice and have facilities for business that are hard to equal. Then, too, their general reputation and business integrity have been such that they have continued to increase their business from year to year until now it has assumed great proportions."

ITALY'S MERCHANT MARINE.

An interesting report made by a German imperial consul, shows that in 1880 Italy entered the commercial world with 7,822 sailing vessels, registering 922,146 tons, and 158 steamers of 77,050 tons—a total of 7,980 vessels and 999,196 tons. In 1890 she had 6,442 sailing vessels of 634,149 tons, and 290 steamers of 186,567 tons—a total of 6,732 vessels and 820,716 tons. In 1901 the last date for which accurate and complete figures have been furnished, the number of sailing vessels was 5,337, with a tonnage of 575,207, and the number of steamers 471 of 424,711 tons, or a total of 5,808 ships and 999,918 tons. The figures for 1901 put Italy ahead of France, which up to that time had held fourth place, with 957,756 tons, among Europe's seafaring states.

Among the ships of 1901 were twenty-five steamers of 37,590 registered tons, worth \$5,640,000, of which four were splendid screw steamers—the Sardinia, Liguria, Lombardia and Umbria. Quite recently a sister ship—the Piemonte—has been added. Besides these vessels and all above enumerated, Italy has caused quite a number of new vessels to be built and bought abroad. In 1901 she had three steamers of 2,189 registered tons, built abroad, while twenty-eight steamers of 24,820 registered tons were bought abroad. She sold thirty-two steamers, registering 21,679 tons. In accordance with the laws of 1896 and 1901 building premiums amounting to \$1,329,959 were paid and tariff rebates amounting to \$33,653 paid back, and \$211,753 paid on trips made to specified places.

Tonnage tax collected by the United States from vessels in foreign trade during the fiscal year ended June 30, 1903, amounted to \$883,434.77. Of this amount British vessels paid \$510,570.30; German, \$122,311.10; American, \$71,970.20; Norwegian, \$36,515.12; French, \$29,156.73; Italian, \$28,447.50; Spanish, \$22,377.40; Danish, \$11,852.37; Belgian, \$10,599.24; all others, \$38,274.12.

The collections for the year were \$14,650.86 greater than for 1902, and are the largest, except 1901, since the law was changed in 1884.

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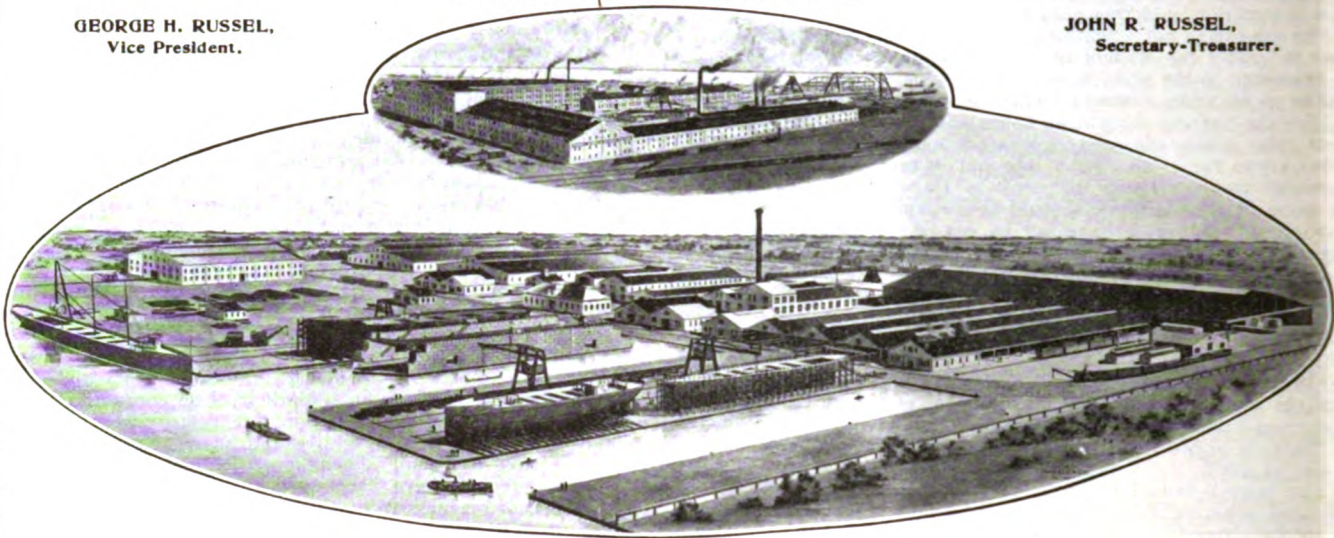
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No. 5.



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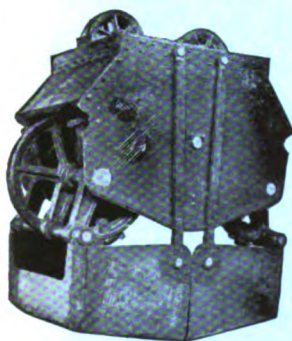
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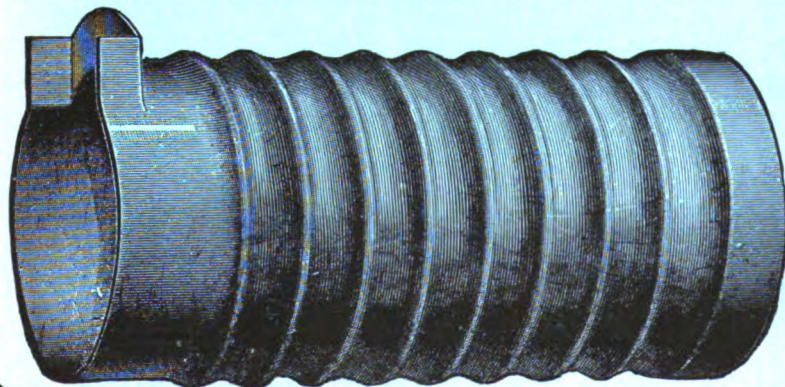
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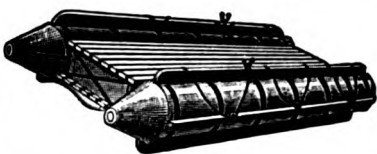
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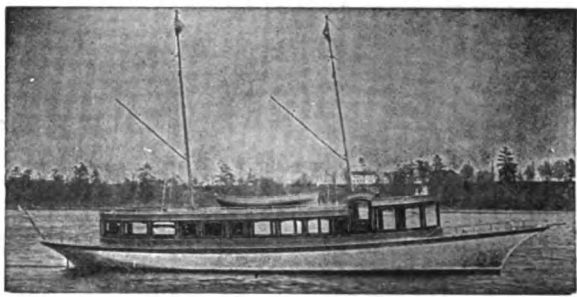
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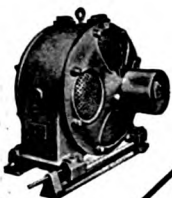
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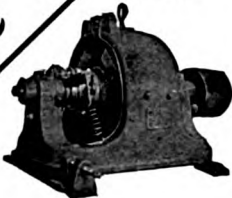
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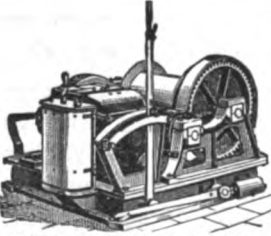
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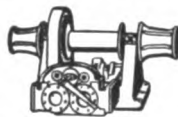
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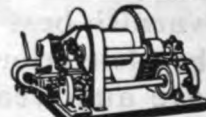
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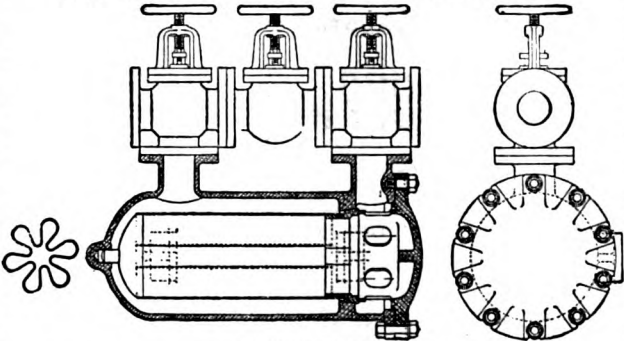
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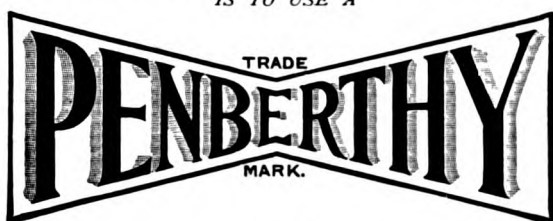
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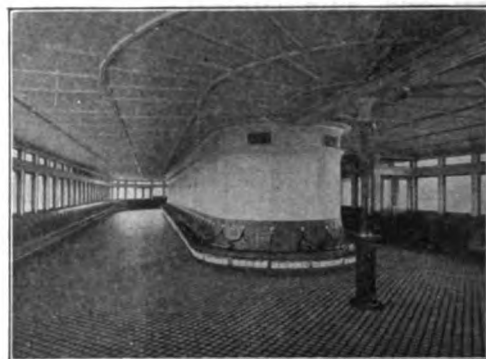
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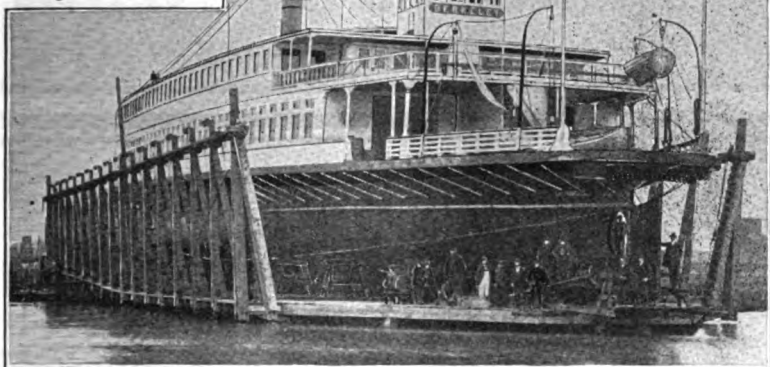
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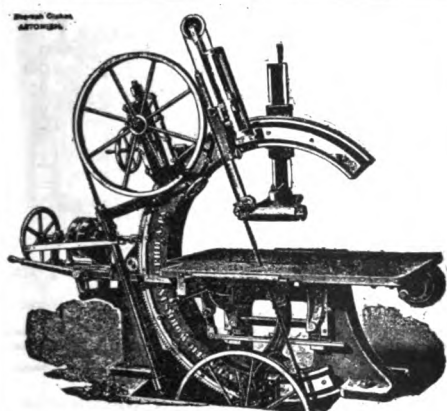
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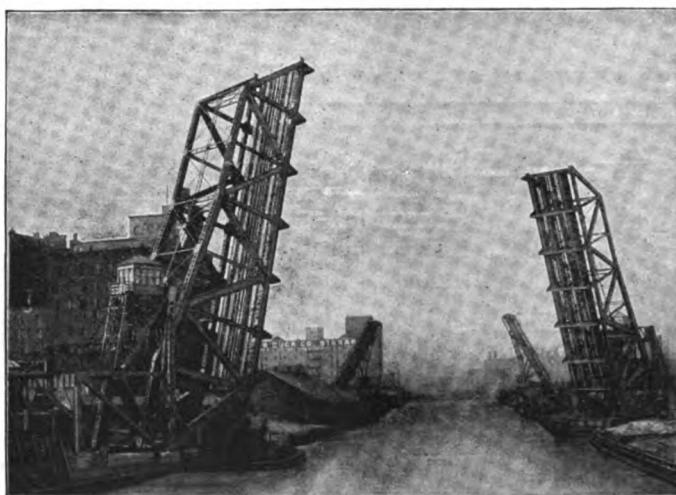
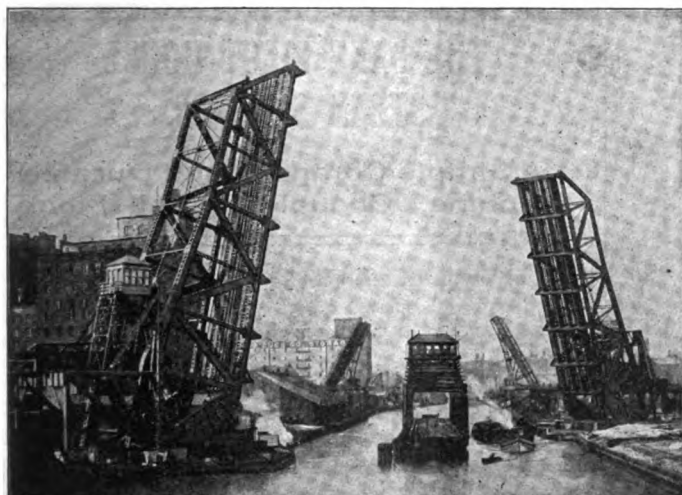
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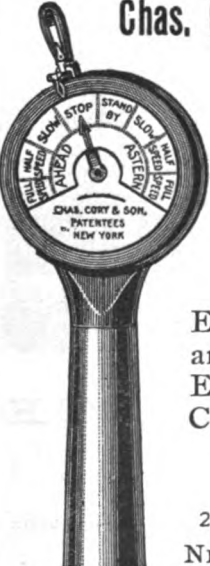
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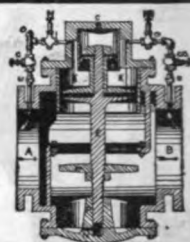
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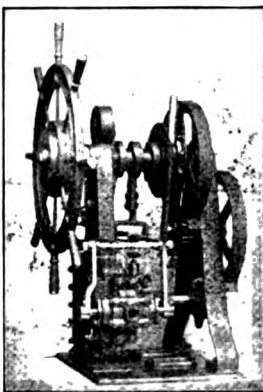
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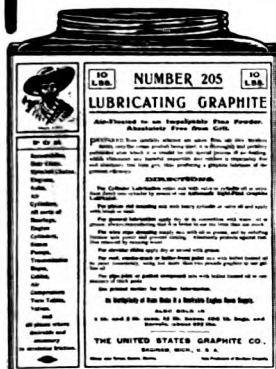
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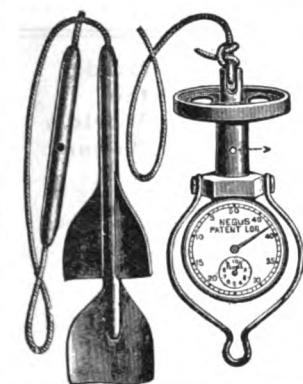
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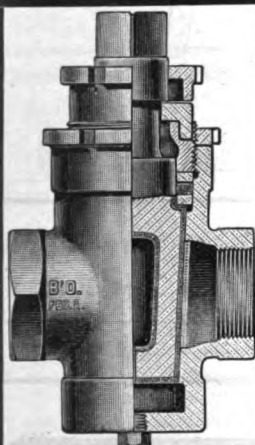
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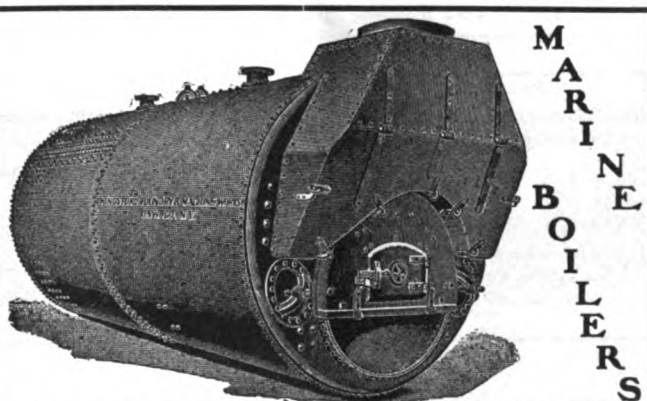
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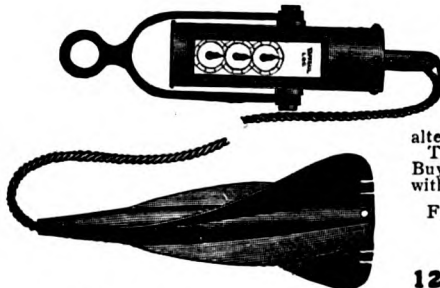


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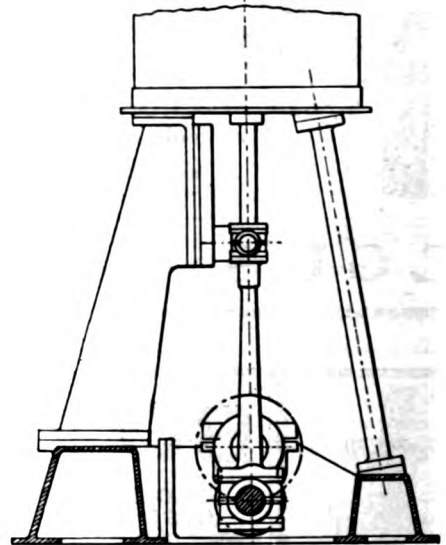
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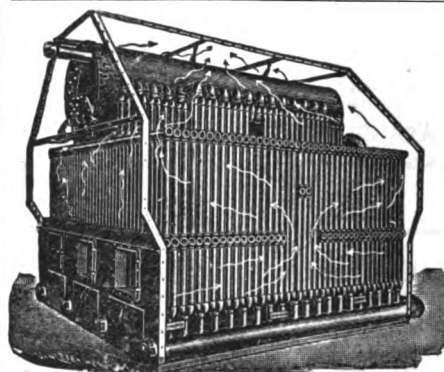
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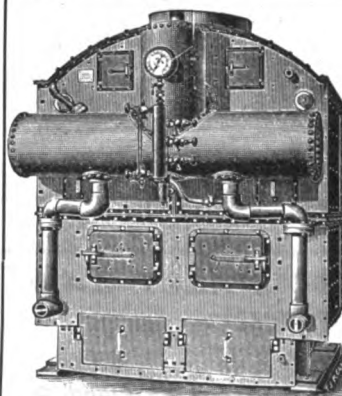
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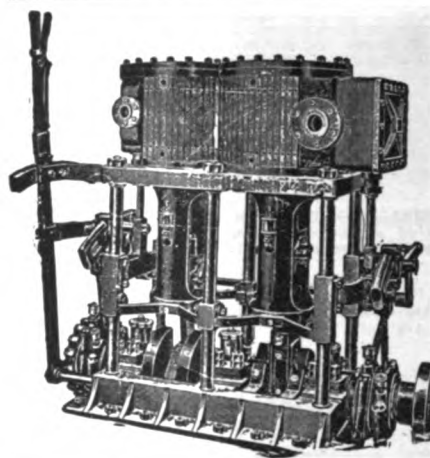
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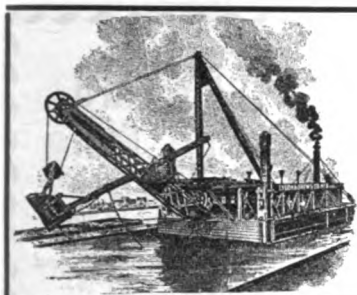
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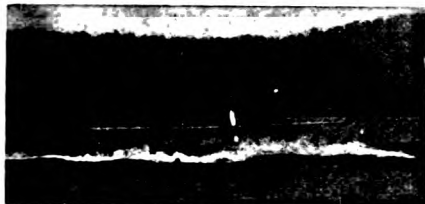
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U. S. Metallic Packing Co.....Philadelphia.  
  
METAL POLISH.  
Bertram's Oil Polish Co.....Boston.  
  
MOTORS, GENERATORS—ELECTRIC.  
Electro-Dynamic Co.....Philadelphia.  
Elwell-Parker Electric Co.....Cleveland.  
General Electric Co.....Schenectady, N. Y.  
"Long-Arm" System Co.....Cleveland.  
Sturtevant, B. F. Co.....Boston.  
Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.  
  
NAUTICAL INSTRUMENTS.  
Bliss, John & Co.....New York.  
Negus, T. S. & J. D.....New York.  
Ritchie, E. S. & Sons.....Brookline, Mass.  
  
NAVAL ARCHITECTS.  
Gaskin, Edward.....Buffalo.  
Kidd, Joseph.....Duluth, Minn.  
Logan, Robert.....Cleveland.  
Matteson & Drake.....Philadelphia.  
Mosher, Chas. D.....New York.  
Newman, R. L.....New York.  
Sadler, Perkins & Field.....New York.  
Wood, W. J.....Chicago.  
  
OAKUM.  
DeGrauw, Aymar & Co.....New York.  
Stratford Oakum Co.....Jersey City, N. J.  
  
OIL FOR PAINTING.  
Sipe & Co., James B.....Allegheny, Pa.  
  
OILS AND LUBRICANTS.  
Dixon Crucible Co., Joseph.....Jersey City, N. J.  
Standard Oil Co.....Cleveland.  
United States Graphite Co.....Saginaw, Mich.  
  
PACKING.  
Crane Co.....Chicago.  
Hayden Mfg. Co., N. L.....Columbus, O.  
Jenkins Bros.....New York.  
Kutzenstein, L. & Co.....New York.  
New York Belting & Packing Co.....New York.  
United States Metallic Packing Co.....Philadelphia.  
  
PAINTS.  
Baker, Howard H. & Co.....Buffalo.  
Betty Bros., Ltd.....Detroit.  
Mohawk Paint & Chemical Co.....Norwich, Conn.  
New Jersey Zinc Co.....New York.  
Sipe & Co., James B.....Allegheny, Pa.  
United States Graphite Co.....Saginaw, Mich.  
Upson-Walton Co.....Cleveland.  
  
PATENT ATTORNEYS.  
Thurston & Bates.....Cleveland.  
  
PATTERN SHOP MACHINERY.  
Atlantic Works, Inc.....Philadelphia.  
  
PIPE—BRASS AND COPPER, IRON PIPE SIZE.  
Waterbury Brass Co.....New York.  
  
PIPE-JOINT COMPOUND.  
United States Graphite Co.....Saginaw, Mich.  
  
PIPE, WROUGHT IRON.  
Bourne-Fuller Co.....Cleveland.  
Crane Co.....Chicago.  
Macbeth Iron Co.....Cleveland.  
  
PLANING MILL MACHINERY.  
Atlantic Works, Inc.....Philadelphia.  
  
PLATES—SHIP, STRUCTURAL, ETC.  
Bourne-Fuller Co.....Cleveland.  
  
PLUMBING, MARINE.  
Reilly Repair & Supply Co., James.....New York.  
Sands, Alfred B. & Son.....New York.  
  
PNEUMATIC TOOLS.  
Allen, John F.....New York.  
Chicago Pneumatic Tool Co.....Chicago.  
  
POLISH FOR METALS.  
Bertram's Oil Polish Co.....Boston.

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## BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

## POWER DOORS AND HATCHES.

"Long-Arm" System Co. .... Cleveland.

## PRESSURE REGULATORS.

Kieley & Mueller ..... New York.  
Ross Valve Co. .... Troy, N. Y.

## PROPELLER WHEELS.

American Ship Building Co. .... Cleveland.  
Atlantic Works. .... East Boston, Mass.  
Bath Iron Works, Ltd. .... Bath, Me.  
Cramp, Wm. & Sons. .... Philadelphia.  
Crescent Ship Yard Co. .... Elizabethport, N. J.  
Detroit Ship Building Co. .... Detroit.  
Fore River Ship & Engine Co. .... Quincy, Mass.  
Great Lakes Engineering Works. .... Detroit.  
Hyde Windlass Co. .... Bath, Me.  
Jenks Ship Building Co. .... Port Huron, Mich.  
Lockwood Mfg. Co. .... East Boston, Mass.  
Macbeth Iron Co. .... Cleveland.  
Maryland Steel Co. .... Sparrow's Point, Md.  
Milwaukee Dry Dock Co. .... Milwaukee.  
Moran Bros. Co. .... Seattle, Wash.  
Neafie & Levy Ship & Engine Building Co. .... Phila.  
Newport News Ship Building Co. .... Newport News, Va.  
Phosphor Bronze Smelting Co., Ltd. .... Philadelphia.  
Tusey & Jones Co. .... Wilmington, Del.  
Risdon Iron Works. .... San Francisco.  
Roach's Ship Yard. .... Chester, Pa.  
Shipowners Dry Dock Co. .... Chicago.  
Smith & Son, Abram. .... Algoma, Mich.  
United States Ship Building Co. .... New York.  
Warrington Iron Works. .... Chicago.  
Willard, Chas. P. & Co. .... Chicago.

## PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co. .... Cleveland.  
General Electric Co. .... Schenectady, N. Y.  
Westinghouse Electric & Mfg. Co. .... Pittsburg, Pa.

## PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co. .... New York.  
Great Lakes Engineering Works. .... Detroit.  
Kingsford Foundry & Machine Wks. Oswego, N. Y.  
"Long-Arm" System Co. .... Cleveland.

## PUNCHES, RIVETERS, SHEARS.

Chicago Pneumatic Tool Co. .... Chicago.

## REFRIGERATING APPARATUS.

Roelker, H. B. .... New York.

## REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register ..... Cleveland  
Record of American & Foreign Shipping. .... New York.

## RELEASING HOOKS FOR DETACHING BOATS.

Standard Automatic Releasing Hook Co. .... New York.

## RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co. .... Cleveland.

## RANGES.

Russell & Watson ..... Buffalo.

## RIVETS—BRASS AND COPPER.

Waterbury Brass Co. .... New York.

## SAFETY VALVES.

American Steam Gauge Co. .... Boston.  
Ashton Valve Co. .... Boston.  
Crane Co. .... Chicago.  
Hayden Mfg. Co., N. L. .... Columbus, O.  
Lunkenheimer Co. .... Cincinnati.

## SAIL MAKERS.

Baker, Howard H. & Co. .... Buffalo.  
Upson-Walton Co. .... Cleveland.  
Wilson & Silsby ..... Boston.

## SALVAGE COMPANIES.

See Wrecking Companies.

## SEARCH LIGHTS.

Elwell-Parker Electric Co. .... Cleveland.  
General Electric Co. .... Schenectady, N. Y.  
Westinghouse Electric & Mfg. Co. .... Pittsburg, Pa.

## SHEARS.

See Punches, Rivets, and Shears.

## SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co. .... Cleveland.

## SHIP BUILDERS.

American Ship Building Co. .... Cleveland.  
Atlantic Works. .... East Boston, Mass.  
Bath Iron Works, Ltd. .... Bath, Me.  
Buffalo Dry Dock Co. .... Buffalo.  
Columbia Iron Works. .... Port Huron.  
Cramp, Wm. & Sons. .... Philadelphia.  
Craig Ship Building Co. .... Toledo, O.

Chicago Ship Building Co. .... Chicago.  
Crescent Ship Yard Co. .... Elizabethport, N. J.  
Detroit Ship Building Co. .... Detroit.  
Fore River Ship & Engine Co. .... Quincy, Mass.  
Great Lakes Engineering Works. .... Detroit.  
Jenks Ship Building Co. .... Port Huron, Mich.  
Lockwood Mfg. Co. .... East Boston, Mass.  
Manitowoc Dry Dock Co. .... Manitowoc, Wis.  
Marine Construction & Dry Dock Co. ....

Mariner's Harbor, S. I., N. Y.  
Maryland Steel Co. .... Sparrow's Point, Md.  
Milwaukee Dry Dock Co. .... Milwaukee.  
Moran Bros. Co. .... Seattle, Wash.  
Neafie & Levy Ship & Engine Building Co. .... Phila.  
Newport News Ship Building Co. .... Newport News, Va.  
Tusey & Jones Co. .... Wilmington, Del.  
Risdon Iron Works. .... San Francisco.  
Roach's Ship Yard. .... Chester, Pa.  
Shipowners Dry Dock Co. .... Chicago.  
Smith & Son, Abram. .... Algoma, Mich.  
United States Ship Building Co. .... New York.  
Warrington Iron Works. .... Chicago.  
Willard, Chas. P. & Co. .... Chicago.

## SHIP CHANDLERS.

Baker, Howard H. & Co. .... Buffalo.  
Moran Bros. Co. .... Seattle, Wash.  
Reilly Repair & Supply Co., James. .... New York.  
Upson-Walton Co. .... Cleveland.

## SHIP LANTERNS AND LAMPS.

Holvig, H. A. J. .... New York.  
Russell & Watson ..... Buffalo.

## SHIP TIMBER.

Martin-Barriss Co. .... Cleveland.  
Moran Bros. Co. .... Seattle, Wash.  
Shurlick, F. S. .... New York.

## SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co. .... Jersey City, N. J.

## SPARS—LARGE SIZES.

Moran Bros. Co. .... Seattle, Wash.

## STAYBOLTS, IRON OR STEEL, HOLLOW, OR SOLID.

Falls Hollow Staybolt Co. .... Cuyahoga Falls, O.

## STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co. .... New York.  
Holmes, Samuel ..... New York.  
King, Rufus S. .... New York.  
McCarthy, T. R. .... Montreal, Can.  
Newman, R. L. .... New York.  
Weeks, F. H. .... New York.

## STEAMSHIP LINES, PASS. AND FREIGHT.

American Line ..... New York.  
Cleveland & Buffalo Transit Co. .... Cleveland.  
Erie & Western Trans. Co. .... Buffalo.  
Goodrich Trans. Co. .... Chicago.  
International Nav. Co. .... Philadelphia.  
Pere Marquette R. R. & S. S. Line. .... Milwaukee.  
Red Star Line ..... New York.

## STEEL CASTINGS.

Seaboard Steel Casting Co. .... Chester, Pa.  
Macbeth Iron Co. .... Cleveland.

## STEERING APPARATUS.

American Ship Building Co. .... Cleveland.  
Chase Machine Co. .... Cleveland.  
Duke Engine Co. .... Grand Haven, Mich.  
Detroit Ship Building Co. .... Detroit.  
Electro-Dynamic Co. .... Philadelphia.  
Hyde Windlass Co. .... Bath, Me.  
Jenks Ship Building Co. .... Port Huron, Mich.  
Sheriff Mfg. Co. .... Milwaukee.

## STOCKS, BONDS, SECURITIES.

Brown, W. W. .... Cleveland.  
Fahey & Co. .... Cleveland.

## SUBMARINE DIVING APPARATUS.

Morse & Son, A. J. .... Boston.  
Schrader's Son, A. .... New York.

## SURVEYORS, MARINE.

Gaskin, Edward ..... Buffalo.  
Matteson & Drake ..... Philadelphia.  
Newman, R. L. .... New York.  
See, Horace ..... New York.  
Wood, W. J. .... Chicago.

## TESTS OF MATERIALS.

Hunt, Robert W. & Co. .... Chicago.  
Pittsburg Testing Laboratory Ltd. .... Pittsburg.

## TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co. .... New York.

## TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F. .... New York.  
Chicago Pneumatic Tool Co. .... Chicago.  
Watson-Stillman Co. .... New York.

## TOOLS, WOOD WORKING.

Atlantic Works, Inc. .... Philadelphia.

## TOWING MACHINES.

American Ship Windlass Co. .... Providence, R. I.  
Chase Machine Co. .... Cleveland.

## TOWING COMPANIES.

Donnelly Salvage & Wrecking Co. .... Kingston, Ont.  
Midland Towing & Wrecking Co., Ltd. .... Midland, Ont.

## TRAPS, STEAM.

Kieley & Mueller ..... New York.  
Lunkenheimer Co. .... Cincinnati.  
Sturtevant Co., B. F. Jamaica Plain. .... Boston.

## TRUCKS.

Boston & Lockport Block Co. .... Boston.

## TUBING, SEAMLESS.

Shelby Steel Tube Co. .... Pittsburg, Pa.  
Waterbury Brass Co. .... New York.

## VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. .... Boston.  
Ashton Valve Co. .... Boston.  
Bordo, L. J. .... Philadelphia.  
Crane Co. .... Chicago.  
Furnan Brass Works ..... Cleveland.  
Hayden Mfg. Co., N. L. .... Columbus, O.  
Jenkins Bros. .... New York.  
Kieley & Mueller ..... New York.  
Lunkenheimer Co. .... Cincinnati.  
Ross Valve Co. .... Troy, N. Y.

## VALVES FOR WATER AND GAS.

Ross Valve Co. .... Troy, N. Y.

## VARNISHES.

Berry Brothers, Ltd. .... Detroit.  
New Jersey Zinc Co. .... New York.  
Also Ship Chandlers.

## VESSEL AND FREIGHT AGENTS.

Boland, John J. .... Buffalo.  
Brown & Co. .... Buffalo.  
Brown, W. W. .... Cleveland.  
Dunham, R. J. .... Chicago.  
Elwell, Jas. W. & Co. .... New York.  
Elphelco, C. W. & Co. .... Chicago.  
Fleming & Co., P. H. .... Chicago.  
Hall & Root ..... Buffalo.  
Helm & Co., D. T. .... Duluth.  
Hawgood & Co., W. A. .... Cleveland.  
Holmes, Samuel ..... New York.  
Hutchinson & Co. .... Cleveland.  
King, Rufus S. .... New York.  
McCarthy, T. R. .... Montreal.  
Newman, R. L. .... New York.  
Mitchell & Co. .... Cleveland.  
Richardson, W. C. .... Cleveland.  
Sullivan, D. & Co. .... Chicago.  
Weeks, F. H. .... New York.

## VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co. .... Boston.

## WIRE—BRASS AND COPPER.

Waterbury Brass Co. .... New York.

## WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co. .... Buffalo.  
DeGrauw, Aymar & Co. .... New York.  
Upson-Walton Co. .... Cleveland.

## WHISTLES, STEAM.

American Steam Gauge Co. .... Boston.  
Ashton Valve Co. .... Boston.  
Furnan Brass Works ..... Cleveland.  
Lunkenheimer Co. .... Cincinnati.

## WHITE METAL—SHEETS, RODS AND WIRE.

Waterbury Brass Co. .... New York.

## WINDLASSES.

American Ship Windlass Co. .... Providence, R. I.  
American Ship Building Co. .... Cleveland.  
Hyde Windlass Co. .... Bath, Me.  
Jenks Ship Building Co. .... Port Huron, Mich.

## WINCHES.

American Ship Windlass Co. .... Providence, R. I.  
Hyde Windlass Co. .... Bath, Me.

## WOOD WORKING MACHINERY.

Atlantic Works, Inc. .... Philadelphia.

## WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co. .... Kingston, Ont.  
Midland Towing & Wrecking Co., Ltd. .... Midland, Ont.

## YACHT AND BOAT BUILDERS.

Drain, Thos. & Son ..... Wilmington, Del.  
Lane & DeGroot ..... Long Island City, N. Y.  
Marine Construction & Dry Dock Co. .... New York.  
Truscott Boat Mfg. Co. .... St. Joseph, Mich.  
Warrington Iron Works. .... Chicago.  
Willard, Chas. P. & Co. .... Chicago.

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Drain, Thos. & Son ..... Wilmington, Del.  
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Detroit Ship Building Co..... 1	King Rufus S. .... 40		
	Kremer, C. E. .... 40		

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No. 20, Chi & Cleve Ex.

No. 28, N.Y. & Bos Ex.

No. 40, Toledo & Buff Ac.

No. 32, Fast Mail

No. 44, Ac via Sandusky

No. 46, Southwestern Ex.

No. 106, Conneaut Accom

No. 6, Lim Fast Mail

No. 26, 20th Cent L.m.

No. 10, C. N.Y. & B Sp.

No. 16, New Eng Ex.

No. 2, Day Express

No. 126, Norwalk Accom.

Westward.

No. 11, Southwestern Lim

No. 7, Day Express

No. 15, Bos & Chi Sp.

No. 19, Lake Shore Lim

No. 23, Western Express

No. 33, Southern Express

No. 133, Cleve & Det Ex.

No. 47, Accommodation

No. 141, Sandusky Accom.

No. 43, Fast Mail

No. 127, Norwalk Accom.

No. 37, Pacific Express

No. 3, Fast Mail Lim

No. 115, Conneaut Accom.

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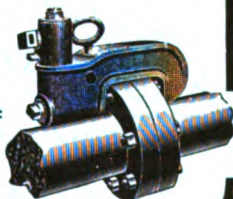
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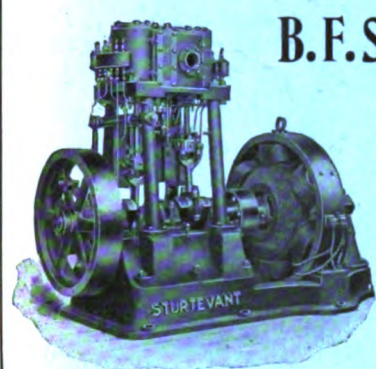
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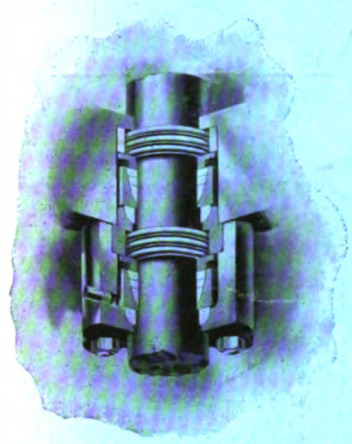
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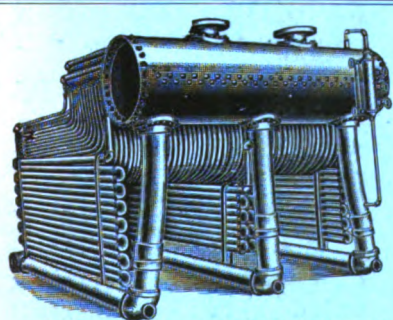
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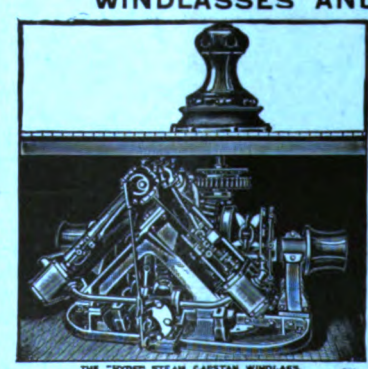
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